

# Amateur Radio

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## Mini satellite antenna rotator

- ▶ FTM-100DR review
- ▶ Battery experiments

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# Amateur Radio

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Peter Kloppenburg VK1CPK



*This month's cover*  
Our cover this month shows an easy to build  
dual-axis rotator system with attached dual-  
band Yagi in operation in front of a group of  
primary School students. Read all about the  
project on page 11. Photo by Joe Gonzales  
VK3YSP. The inset is the Yaesu FTM-100DR dual  
band transceiver, reviewed in this issue.

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## Contributions to Amateur Radio



Amateur Radio is a forum for  
WIA members' amateur radio  
experiments, experiences,  
opinions and news. Manuscripts  
with drawings and/or photos are  
welcome and will be considered  
for publication. Articles attached to  
email are especially welcome. The  
WIA cannot be responsible for loss or damage to any material.  
Information on house style is available from the Editor.

### Back Issues

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### Photostat copies

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### Disclaimer

The opinions expressed in this publication do not necessarily  
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A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs; that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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Representing

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*Member of the International Amateur Radio Union*

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## Editorial

Peter Freeman VK3PF

### A busy few weeks

The past three weeks have been busy here with radio activity.

I have been slowly moving forward on the conversion of a 3.4 GHz commercial panel transceiver to an amateur 3.4 GHz transverter. These panels were sourced via the Geelong Amateur Radio Club – you may have seen reference to the project in their Club news. The panel conversion is moving forward slowly as the task has been interrupted by other radio undertakings.

Perhaps most significant of these involves the use of an IC-7300 over the past three weeks. Just prior to Easter, I received a call from Icom Australia advising that the first shipment of radios had arrived. Would I like to pick up a radio to assess, or should they arrange to have the radio shipped to me? I quickly decided to make the trip to Melbourne to take delivery direct at the Icom office. By late Wednesday afternoon, the radio was up and running on the workbench.

Unfortunately, the radio has been returned! But we plan to have the review completed in time for inclusion in the June issue.

I also spent three days travelling to East Gippsland to activate some Parks and SOTA summits. Fortunately, the weather was largely cooperative, except for some light rain on Saturday afternoon. I made seven activations, with six VKFF references and three SOTA summits qualified. It was also great to be the station that gave at least one amateur his last (45<sup>th</sup>) National Park for the Keith Roget Memorial National Parks Merit Award as a Chaser. This three-day activity coincided with the third anniversary

of the SA National Parks and Conservation Parks Award scheme, so there was plenty of Parks activity on the air: 40 m was very busy for much of the weekend.

### DX News

Some readers will have noticed that the DX News column has been missing since late last year. I have sent several emails to Nick VK2DX enquiring if he was willing and able to continue, but all have gone unanswered. The last column contribution from Nick was published in the November issue. As I have said before: I cannot publish material if it is not submitted.

In late February, I received an offer to assist with proof reading. Once we had sorted out the details, I was able to accept the offer and at the same time offer "retirement" from the proof reading team to a member of that team who works on weekends and thus found it difficult to complete the proofing task in a timely manner. He eagerly accepted the offer. This change should not have much visible influence on most readers.

As a consequence of the changes, we now have a new DX columnist, commencing this month. Welcome to Luke VK3HJ, who drops the proofing task but offered to compile a DX column.

### ARRL CEO David Sumner K1ZZ retires

Many amateurs will be aware that the ARRL CEO David Sumner K1ZZ retired on 18 April, after leading the ARRL staff for 34 years.

Continued on page 10





## WIA comment

Phil Wait VK2ASD

### What does the WIA do for me?

We constantly get asked *"what does the WIA do for me - why should I be a member"* and when we tell them what we do they retort *"why do you hide your light under a bushel"*. Fair comment, so I'm going to tell you what the WIA has done this month.

The month kicked off with the ACMA's two-day RadComms 2016 conference in Sydney, entitled *"Discovery, disruption and demand"*, and with a theme focusing on *"enabling innovation"*. We heard about the vision for a connected world where everyone, everything, everywhere, is going to be connected and monitored via the Internet of Things. There's one thing certain, it's going to be a very fast-paced and connected world, where collection and analysis of data generates the big dollars, and there are going to be huge demands on spectrum.

At RadComms, the Minister for Communications, the Hon Senator Mitch Fifield, distributed a Consultation Paper for the proposed new 2016 Radiocommunications Act. In the Minister's words, *"A new Radiocommunications Bill will modernise our regime, and allow industry greater scope to respond quickly in the market to emerging technologies and services."* As expected, apparatus and spectrum licensing will disappear, to be replaced by parameters-based licensing, and Class licensing will be replaced with 'spectrum authorisations'. Spectrum administration will increasingly become the work of private band managers, or in the case of Amateur Radio, possibly a service manager.

The new Radiocommunications Bill holds both challenges and opportunities for the Amateur Service, but we believe it also holds a rare opportunity for Amateur Radio in Australia.

Shortly following the release of the Consultation Draft by the Minister, the WIA made a major submission to the ACMA in which we suggested variations to the conditions of all three amateur licence classes, and to the Spectrum Plan. The intention is to both improve the operating privileges for Australian Radio Amateurs, bringing them up to parity with other western nations, and also to make Amateur Radio more relevant in the modern, digitally-connected age. As I write this comment, we are preparing to meet with the ACMA to discuss the WIA's submission, and other matters which may eventually lead to greater self-determination for the amateur service. I expect that, by this time this comment is published, the submission will be available on the WIA website.

Work has started on the WIA's response to the Consultation paper itself, which is due by the end of April, representing many tens of hours of highly specialised work.

The National Office has been working on the WIA's Club Insurance Scheme over this month, with the able assistance of Ted Thrift VK2ARA. Ted has been administering the Club Insurance scheme for the past 10 years, and has recently retired from that role. We all thank Ted very much for so expertly handling this tedious and

difficult job for so long, and the WIA Office is very quickly learning just how time consuming it really is chasing Affiliated Clubs for their membership numbers in order to make the required single insurance payment by the due date.

Last month, I mentioned in my Comment that the WIA had attended a PLT/BPL workshop hosted by the ACMA in Sydney. Following that workshop, we made a submission to the ACMA expressing the WIA's concerns about the consumer and interference risk of PLT/BPL devices, and the rising level of electromagnetic pollution generally. The WIA's submission is available on the WIA website.

Each year, the WIA's accounts are reviewed by our Auditor for presentation to the membership at the AGM. This year is no different and, at the time of writing, over the past week or so the WIA's Treasurer and Executive Manager have been working closely with the Auditor/reviewer. The final result is not known at the time of writing, but everything has gone very smoothly with the Review this year, especially considering the total restructuring of the National Office operations. I expect the financial report will show a small loss, which is pretty good, considering the unusual but necessary expenses last year associated with the restructure.

Add to all this activity the normal day-to-day workload, the callsign and licence assessments carried out on behalf of the Commonwealth,

Continued on page 5



## VK100ANZAC to be on air in July

The Wireless Institute of Australia has proudly assigned VK100ANZAC to the Geelong Amateur Radio Club on July 19-21, the 100th anniversary of the Battle of Fromelles. Australia sustained 5,500 casualties in that battle, the worst 24 hours in our military history.

Geelong Amateur Radio Club spokesman Barry Abley VK3SY says the event is in recognition of a tragic period which caused loss and grief to countless people and nations.

Supported by the WIA, invitations are extended to other International Amateur Radio Union member societies to consider how to join the event. At Geelong the venue will be historical Osborne House, Australia's first Naval College and in a number of uses was a WWI military hospital.

Some details of the commemoration of the Battle of Fromelles on Western Front are still being finalised, but will be announced as this anniversary approaches. This is part of the Federal Government ANZAC Community Grant program that included V13ANZAC in August 2014 to commemorate the "First Shot of the Great War" fired by Australia. From Fort Queenscliff the order was given to fire across the bow of the fleeing German merchant ship *Pfalz*, to prevent it from leaving Port Phillip Bay.

The First Shot campaign commemorated Australia's first action in the war, and taking part was the Geelong Amateur Radio Club.

## The WIA AGM program on Norfolk Island

Those booked to be part of WIA program on Norfolk Island this year were sent a website link for

registration details and payment for the various events. Most group operators working through the Norfolk Island Tourist Centre require final numbers about 60 days prior to arrival. This is to enable all arrangements to be made including having adequate catering supplies on hand.

The WIA website [www.wia.org.au](http://www.wia.org.au) has additional information for some activities over the two weeks from May 24 to June 2, including the speakers for the Saturday afternoon and the AGM Dinner. WIA Annual Conference Dinner keynote speaker is The Honourable Gary Hardgrave, Administrator of Norfolk Island, and guest speaker Doug McVeigh VK0DMV who twice used V10ANZAC during the WIA ANZAC 100 program.

The local newspaper, The Norfolk Islander, will be sent a media release explaining the WIA AGM program and its associated events.

## Submission on in-home powerline device review

The WIA urges that action be taken against all in-home powerline telecommunications (PLT) devices that do not comply with the CISPR 22 (International Special Committee on Radio Interference) standard.

The Australian Communications and Media Authority (ACMA) is reviewing the regulation for PLT devices that send radio frequency signals over powerlines to enable broadband access including the internet.

The WIA actively participates in the work of spectrum management, consultative standards bodies, and as a member society also contributes its expertise through the International Amateur Radio Union. The WIA has been very active in the PLT arena, both as a member of Australian Standards

committee TE 003 and through direct representations to the ACMA and participation in domestic trials.

In a submission it called for the ACMA to continue with the CISPR 22 standard to ensure the protection of existing and future radiocommunication services from radio noise pollution or interference. The ACMA has asked whether it should use an alternative standard (EN50561), but the WIA is against that move describing CISPR as remaining to be the most relevant organisation in the area of the PLT standard. If the ACMA chose to adopt the alternative, the WIA wants it modified for Australian conditions including its compliance test regime, and the notching for protected frequencies be a permanent feature that cannot be removed or deactivated. While notching has greatly reduced interference, currently not all amateur radio bands are given that protection.

The WIA wants a warning notice on all PLT devices that state such devices may be responsible for radio interference that needed remedial action including removing the device from use. Suppliers have imported PLT devices that are not compliant with CISPR 22. The WIA believes there should be more effective compliance measures for all imported devices, together with frequent random checks and audits. Harmful interference can disrupt or degrade existing spectrum users, some of a medical nature, but that use will rapidly grow in a few years.

The WIA submission is available on the WIA website: <http://www.wia.org.au/newsevents/news/2016/20160412-3/documents/WIA%20-%20ACMA%20-PLT%20Submission%20-%20April%202016%20Final.pdf>





supporting the work of the WIA Assessors, the 60 or so emails received by the WIA office each day (most of which require some sort of redirection or follow-up), sending out 'welcome aboard' packages to new members, new initiatives to pursue such as STEM/STEAM education, updating and reprinting the Foundation Licence Manual (now in Edition 3), and getting everything together for the AGM at Norfolk Island in late May, and you should be getting some idea of the work the staff and volunteers at the WIA do for you each month, continuously, day-in day-out.

Why wouldn't you want to support that?

During May, we will have the added task of organising everything for the AGM on Norfolk Island.

There has been a lot of discussion about the cost of hosting that event, and the fact that Directors may be getting a "free holiday in the South Pacific at member's expense", as a vocal brigade has alleged. Let me dispel a couple of myths. Firstly, the WIA has secured a very good deal, and the cost of holding the venue is expected to be less than previous years' AGM events in capital cities such as Canberra, Darwin or Perth. Secondly, I am of the opinion that being a Director of the WIA should not only be a rich man's game, and (in accordance with the Constitution) the WIA should cover Directors' reasonable expenses when they are on WIA business. This has been the WIA's custom and practice from the get-go. Having said that, this year, I have allowed

Directors to pay their own travel expenses to Norfolk, strictly on a voluntary basis. I have no idea what arrangements individual Directors are making, and I don't want to know, but I suspect the overall cost to the WIA this year is going to be very low indeed.

PS: Following my April Comment, a good friend of mine (Volcanologist, Arthur, for those of you who know him) reminded me that, over recent decades, we have had two PMs called Malcolm. Malcolm Number 1 would have lamented that "life was not meant to be easy" (to be a WIA president). However, Malcolm Number 2 would enthusiastically proclaim that "there has never been a more exciting time" (to be a WIA president). His advice is, go with the latter guy.



## WIA Annual Election 2016

The voting for the election of three Directors, for a two year period, was conducted during the month of March 2016.

The Ballot paper formed part of the March AR address cover sheet; an envelope for the ballot paper and a reply paid envelope were included in the WIA member AR circulation. A separate mail out to Family and non-AR (magazine) members was also made. Electronic voting papers were also sent to some members upon request, for mail return.

1199 eligible reply paid envelopes were received by the closing of the postal ballot, as at the last mail collected on the 31 March 2016. The date was extended to allow for Easter holiday shutdown and slow mail handling. Franking on these envelopes indicated all had been posted before the closing date.

The Returning Officer, assisted by two scrutineers, Bob Duckworth VK3AIC and Bob Tait VK3XP, both WIA long-standing members, counted and then opened the envelopes, before counting the ballot votes.

Just over 18 "man" hours went into the process of dealing with the 1199 eligible items.

A further nineteen reply paid envelopes were deemed invalid as the senders had not completed the required identification on the envelope, so their entitlement to vote could not be validated against the member database by WIA office staff.

There were a further 15 informal ballot papers as either all names, no names or insufficient names had been marked to indicate a valid vote. The use of numbers, 1, 2, 3, ticks & crosses, is also invalid.

The results of the election, in ballot (alphabetical) paper order are:

Stuart Fillmore VK5STU	348
John Fisher VK3DQ	158
Marc Hillman VK3OHM	360
James Linton VK3PC	311
John Longayroux VK3PZ	265
Paul Simmonds VK5PAS	705
Andrew Smith VK6AS	439
Phil Wait VK2ASD	657

Thank you to all who voted in this election, a notable increase of about one third over last year.

Thank you to the candidates for making yourselves available to serve the WIA membership and the Australian amateur radio community.

Envelope returns by State: VK1 25, VK2 239, VK3 345, VK4 191, VK5 147, VK6 192, VK7 51, VK8 8, Overseas 1. Invalid 19.

I declare the above results to be an accurate presentation and record of the ballots received. I therefore declare Paul Simmonds VK5PAS, Andrew Smith VK6AS, and Phil Wait VK2ASD to be elected for a two year term, as Directors of the WIA, commencing after the AGM in May, 2016.

**Geoff Atkinson VK3AFA**  
WIA Returning Officer





# Improved Battery - William Bleeck History

## Part Three: Experimenting

Don Marshall VK4AMA



Figure 1: Promotional booklet, 1926.

Will Bleeck and family returned to Queensland from Victoria in 1917 to establish a typewriter sales and repairs shop at South Brisbane and then in Queen Street, Brisbane. In December 1920, he was the business brain behind the takeover of a fur and skin tanning business from his father and mother-in-law. This prospered and by 1924 the family owned a large house in suburban Annerley, complete with a large workroom under with long wooden shelves and benches.

Here Mr Bleeck, apparently undaunted by his previous

attempts, continued experimenting with his double fluid primary battery invention using containers and chemicals from 10-15 years previous. When the Bleecks bought a family holiday home at bayside Redcliffe in the 1920s, there was no electricity for private use. Will's batteries were able to generate sufficient power to run lights and fans in this house.

In his typical German methodical manner then, this time he acted personally. In June 1925, he entered into an agreement with a company being formed to sell the Australian

interest in a new Commonwealth patent no. 21917 for £1000 plus 20,000 fully paid up shares. The company was soon formed and the public offered 20,000 shares at five shillings each with the balance on call.

The prospectus stated: "During the Great War period the battery could not be marketed owing to lack of certain chemicals and until the advent and general adoption of radio broadcasting there was no really wide market for the battery. The inventor left it more or less in abeyance until quite recently. Then



his wireless researches convinced him that if radio was going to progress as it should where it was most needed – in isolated parts of the country. – the Bleeck battery must be brought into use again ... as an indispensable adjunct to wireless."

The new company published and distributed thousands of copies of a small booklet: *Something new in electricity*. With a deluxe model showing two cells in an ebonite container on the cover, it claimed to be fully charged in one minute with a capacity of more than 50 ampere hours at 5.5 volts. It was especially adaptable to radio battery use (for the low voltage filaments valves then in use). An alternative style was two cells in glass in a wooden box.

Further demonstrations of the current styles were given for the Brisbane press. At one, Mr Bleeck claimed that two of his cells would operate a five-valve radio set for 60 hours or run an eight-inch fan for the same period either continuously or intermittently, the cost working out at about one half-penny per hour.

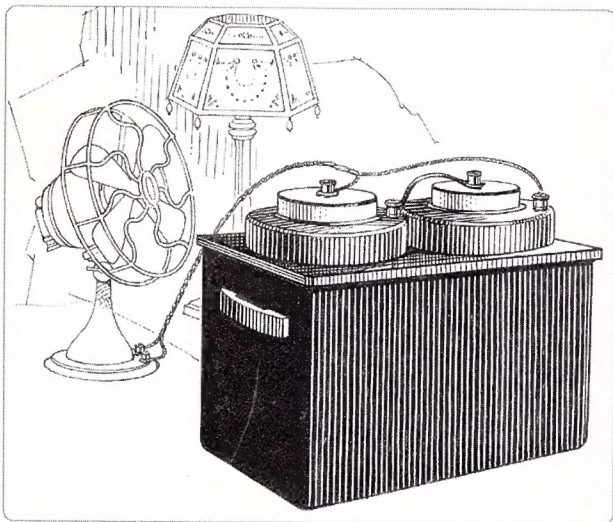


Figure 2: Drawing showing the battery powering a fan.

Opinion was given that the battery undoubtedly would increase and popularise the reception of wireless broadcasting in the country districts where it was practically impossible or very inconvenient to have the ordinary accumulators recharged. In fact, radio dealers in all the States had declared that they could sell twice the number of wireless valve sets in the country districts if only they had a battery that was easily chargeable.

The invention filled this much needed want and a big demand was expected for it immediately it was placed on the market. The manufacture of the cell was being proceeded with as fast as possible and arrangements would be made for its distribution throughout the Commonwealth. Practically everything was being manufactured in Australia and the company expected to build a big organisation as soon as the models were ready. Mr Bleeck was personally supervising the manufacturing.

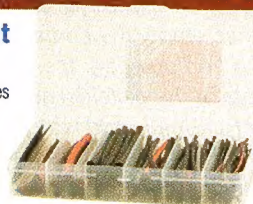
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Manufacture must have started relatively quickly. The Bleeck Radio Battery was widely advertised in newspapers and in a handbook for radio enthusiasts.

Directions for charging were included with each battery: "For the depolariser in a glass jar or ebonite container, empty the contents of bottle A (red powder), then the contents of the colloidal solution (bottle B). Simply add water until even with the level marked. Now place the carbon cylinder into the solution as the positive terminal." The ingredients were hydrochloric acid, ferrous or nickel sulphate or a mixture, and chromic acid.

"For the excitant, empty the two bottles marked C into the white porous pot and add a little water to within three inches of the top. Then place the zinc negative terminal into the pot. Then place the porous pot with zinc into the centre of the carbon cylinder. Two or three cells can be connected in series." The ingredients were sodium hydroxide plus sodium silicate as a colloidal substance to improve efficiency.

The zinc element was a cylinder of about 1 inch (25 mm) in diameter, the porous pot was about

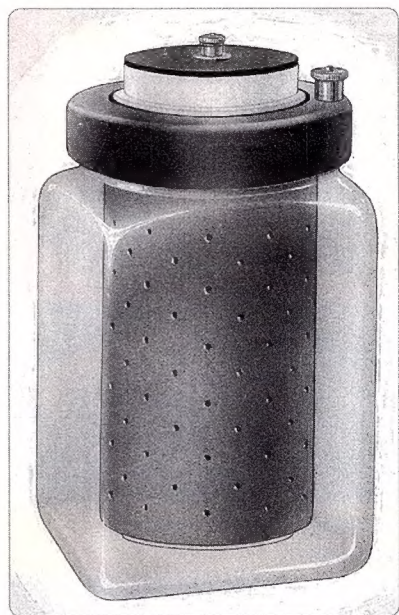


Figure 4: Sectional views of the Bleeck radio cell. 1. Glass jar. 2. Carbon cylinder. 3. Porous pot. 4. Zinc.

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BLEECK HOUSE, BURNETT LANE, BRISBANE  
W. A. BLEECK (Inventor) Managing Director

Page 1

Figure 3: Advertisement from a radio enthusiast magazine, 1926.

2 1/2 inches (64 mm) in diameter, and the carbon cylinder about 4 inches (100 mm) in diameter. The pot had a glazed top third. The carbon cylinder with collar had a varnished top section too. These features apparently were to limit the chemical reaction in the event of overfilling of one or both fluids. The glass and ebonite containers were square shaped, possibly for ease of manufacturer over cylindrical containers and for transport, though cylinders might have produced more efficient results chemically.

General information including not splashing, not discharging below 1.5 volts a cell, not to allow to idle after both solutions had become exhausted, recharging by discarding the two solutions, washing the porous pot and zinc in water before refilling, and if not to be used for a time washing thoroughly with some spirits of salts in the porous pot for an hour or two.

"There is absolutely no risk from shocks, fires, explosions etc either from the cell itself or the chemicals but every care should be taken not to spill the solutions, or allow them to come into contact with the hands or clothes."

But as with the first battery business, all was not well with the company and its sales (or lack of them). While very aware of many things electrical, Mr Bleeck failed to account for advances in technology such as the use of mains transformers to power wirelasses. The uses for a primary battery had been greatly reduced.

In the country, properties were installing petrol and diesel engines with dynamos connected to chargeable accumulator batteries supplying 32 volts direct current. There was an ever wider range of lights and appliances to suit both systems.

Then the company's brokers failed to sell sufficient shares to enable it to keep operating. Several writs were issued against the company alleging misrepresentation by the salesmen. Mr Bleeck was directed to take steps to defend them.

In March 1927, the Bleeck radio batteries were submitted for testing by Professor Thomas Parnell, Founding Professor of Physics at The University of Queensland. The tests were to determine the useful life of six cells of slightly different composition. In each test, the cell was discharged through a variable resistor as to keep the current practically constant. At intervals, readings were taken of the terminal voltage as available for use.

Detailed results were provided in tables and graphs. Initial open circuit EMFs ranged from 2.56 volts to 2.66 volts. With discharges of 0.5 amps, the 2.58 V terminal voltage of 80% strength cell A fell to the 'high efficiency life' of 2V in 45 hours and the full strength cell B from 2.66V to 2V in 55 hours. Throughout the tests, no current fluctuations were noticed.





Figure 5: Bleeck Radio Battery in the Physics Museum, University of Queensland, showing the carbon and zinc elements, the porous pot, ebonite container, and the side nameplate.

Professor Parnell wrote: "The steady current given by the cells combined with the very slow voltage drop for currents up to 0.5 amperes suggests that a Bleeck radio battery is eminently suitable for use with wireless sets. According to my

tests a set whose filament current consumption did not exceed 0.5 amperes at 4 volts could be run by a two-cell battery before recharging. I know of no other primary battery cell of comparable voltage which gives an equally steady discharge."

It was with very mixed feelings that Mr Bleeck faced the annual general meeting in September 1927. He presented a three-page typed report stating that many difficulties and unforeseen troubles, technical and legal, in the past 12 months had delayed and hampered the company from resuming trading. Pots made in Sydney had proved unsuitable and imported ones were worse. Metal collars and carbons were also unsatisfactory.

He must have been devastated when he was outvoted by other directors, who soon after put the company into liquidation. The liquidator invited tenders for the purchase of the stock, fixtures and fittings and of the patents relating to improvements in primary batteries, even before some overseas patents were granted! There cannot have been an offer.

Will kept some stocks of the battery parts and booklets in his workroom at his Annerley home, spilling over into an adjacent

# TET-EMTRON

## Home Brew Parts.

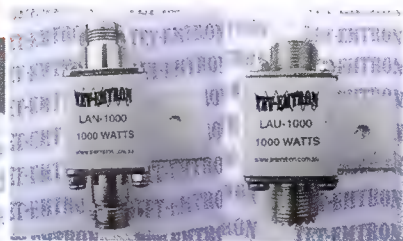
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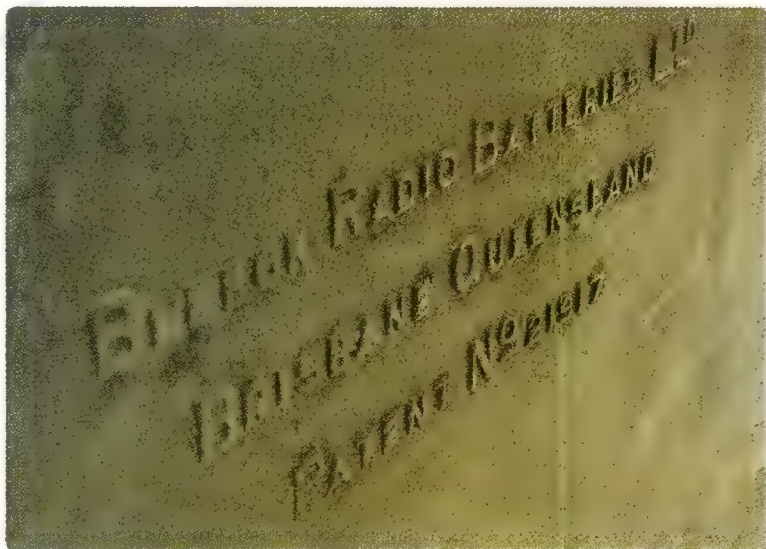


Photo 6: Detail of the name plate on the battery container.

garage. It was his nature never to give up experimenting. He died suddenly in June 1939.

In view of two company failures involving the same product, the question arises whether Mr Bleek

was a confidence trickster or a frustrated inventor of a useful device? My opinion after years of family discussion and the information above is that he was a brilliant man, sincere in his desire to help fellows Australians, and to have some return for his years of battery research. But while in the early days he was ahead of his time with his thinking, he was unable to keep pace with the haste of technological development in the early 20<sup>th</sup> century.

I now know why my mother Jessie, one of Mr Bleek's daughters, had tears in her eyes when, as a result of our kids play in the Annerley workroom in the 1940s, she saw on the floor fragments of battery glass jars and porcelain pots – an experimenter's shattered dream.

## Editorial

Some may ask "Why is this significant to us in VK?"

Like Michael Owen VK3KI (SK), David has also played very significant roles in international Amateur Radio affairs, including the IARU and World Radio Conferences.

The International Amateur Radio Union President Tim Ellam VE6SH/G4HUA has presented David Sumner K1ZZ with the IARU's prestigious Michael J. Owen VK3KI Memorial Award. Tim Ellam cited David Sumner's "skill, diplomacy, and encyclopaedic knowledge" of Amateur Radio, and his role on the international scene, as most deserving of the award.

You can read more about David K1ZZ in QST, on the ARRL website and on the WIA website:

<http://www.wia.org.au/newsevents/news/2016/20160217-1/index.php>

### Social media and "WIA issues"

I do not plan to mention any detail about the ongoing airing of views surrounding WIA operations that have occurred in this magazine and on various social media sites.

We published a detailed *Over to You* plus a response from the Board last month. I have received further correspondence around these issues, but I decided that little would be gained by publishing them in this, or any future issue. I advised the authors individually of the decision and did receive some further correspondence surrounding my decision. One of the authors

advised that the content was going to be published on-line regardless of my decision.

I will leave individual members to seek and read the available material, to ask questions in appropriate forums and then you may form your own conclusions. If the authors wish to pursue their issues, I suggested that mechanisms other via this magazine might be more appropriate.

As the President has previously noted, it is not easy to be involved in changing the way an organisation operates!

Until next month,  
Cheers,  
Peter VK3PF

# GippsTech 2016 | 9 & 10 July 2016



# A mini satellite-antenna rotator

Julie Gonzales VK3FOWL and Joe Gonzales VK3YSP

## Introduction

This article describes the design and construction of a mini antenna rotator for tracking amateur radio satellites. The inspiration for this project was to provide a portable and appealing demonstration of amateur radio satellite operation for our primary school amateur radio clubs. The results have been completely satisfactory.

To communicate via amateur radio satellites in low earth orbit a directional antenna with even a few decibels of gain is a definite advantage. However, the antenna must be pointed at the satellite for about 10 minutes during a typical overhead pass.

The 3 dB beamwidth of a typical small handheld Yagi antenna is quite large, around 30 degrees, so the pointing accuracy required is not very great. Nevertheless the antenna has to be steerable to every point in the sky.

Our problem was that holding the antenna and pointing it in the right direction for an entire satellite pass was a real chore for small children. It detracted from the novelty of amateur radio satellite communications. So it was time for technology to step in and make our lives easier. This mini satellite-antenna rotator was the result.

## General approach

Classically, antenna rotators use mechanical angle sensors (potentiometers or shaft encoders etc.) to determine the antenna's relative orientation from a fixed reference point: typically true North and horizontal level. The rotator has to be installed in a fixed manner and oriented correctly to ensure pointing accuracy. This approach is hardly suitable for portable operation and rapid deployment.

Instead, this rotator uses

an electronic sensor and a microcontroller to determine the absolute azimuth and elevation angles of the antenna.

The installation and orientation of the rotator is not critical. It requires no special on-site calibration. Even if the rotator mounting is moved during operation it will automatically reacquire the correct position, potentially making it suitable for land mobile or maritime applications.

The rotator's mechanical design is very simple, requiring no sensor couplings, limit switches or calibration reference points. The design is scalable to very large antennas by using bigger motors and larger AC or DC motor speed controllers. The hardware is inexpensive and the software is free.

## How it works

The rotator is mounted on a tripod. It supports the antenna. The sensor



Photo 1: School Amateur Radio Club.



is strapped to the antenna boom and is connected to the rotator by a short fly lead.

Inside the rotator enclosure a microcontroller computes the azimuth and elevation of the antenna from the sensor data. It controls two small DC motors to orient the antenna to the required position. The rotator requires an external 12V DC power source for the motors.

The antenna position is controlled by connecting the rotator to a Personal Computer (PC) via a USB cable. On the PC, a serial terminal application can be used for manual control or a satellite tracking application can be used for automatic tracking.

### Theory of operation

The electronic sensor consists of an array of six Micro Electro-Mechanical System (MEMS) devices, in a single integrated circuit package, mounted on a small printed circuit board.

The sensor simultaneously measures the orientation of the Earth's magnetic field (M) and Earth's gravitational field (G), each in three dimensions with respect to its internal X, Y and Z axes. The sensor is physically strapped to the antenna with its Y-axis pointing along the antenna boresight and its X-axis horizontally to the right of that.

Now it has to be taken into account that the vertical and horizontal orientation of Earth's magnetic field varies both locally and, to a lesser extent, over time.

Today, in Melbourne for example, M is tilted upwards at 68.7 degrees and pointing 11.6 degrees to the East of true North. The first angle is known as the *magnetic inclination*. The second is the *magnetic declination*.

By comparison G is much more predictable: It just points

downwards anywhere on the surface of the Earth.

But simply knowing the orientation of the M and G with respect to the antenna is not sufficient. We need to know the orientation of the antenna with respect to the ground.

The benefit of measuring both M and G now becomes apparent: If we draw a line perpendicular to both M and G it points magnetic East-West. A line perpendicular to that one and G points magnetic North-South. And a line parallel to G points Up and Down. So now that we know where the ground is we can calculate the antenna's

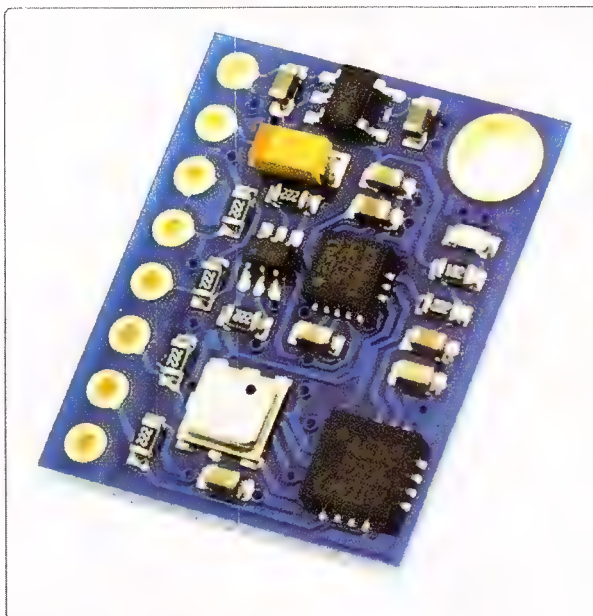
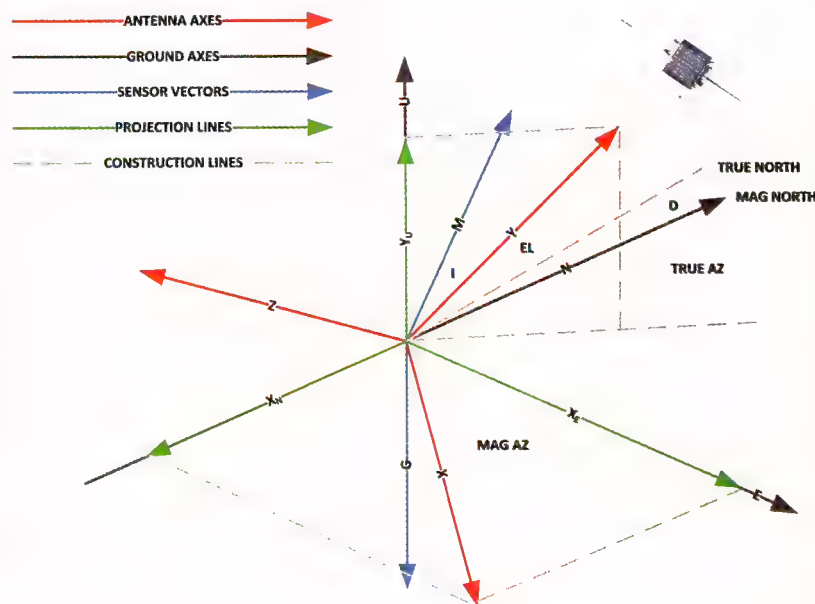


Photo 2: Sensor Board.



**XYZ = ANTENNA AXES, Y = ANTENNA BORESIGHT VECTOR**

**ENU = GROUND AXES, MAGNETIC NORTH REFERENCE**

**M = EARTH'S MAGNETIC FIELD VECTOR**

**G = EARTH'S GRAVITATIONAL FIELD VECTOR**

**E = MAGNETIC EAST VECTOR =  $\underline{G} \times \underline{M}$**

**N = MAGNETIC NORTH VECTOR =  $\underline{E} \times \underline{G}$**

**U = MAGNETIC UP VECTOR =  $-\underline{G}$**

**D = MAGNETIC DECLINATION  $\approx 11^\circ 39' \text{ E}$  (MELBOURNE)**

**I = MAGNETIC INCLINATION  $\approx -68^\circ 43'$  (MELBOURNE)**

**$Y_U = Y \cdot U, X_N = X \cdot N, X_E = X \cdot E$**

**$AZ = \text{TRUE AZIMUTH} = \text{ARCTAN}(-X_N/X_E) + D$**

**$EL = \text{TRUE ELEVATION} = \text{ARCTAN}(Y_U/Z_U)$**

Figure 1: Vector Diagram.



elevation from the horizontal and its azimuth rotation from magnetic North. We just need to add the magnetic declination to get its true azimuth.

The problem can be visualised as shown in Figure 1. The red sensor axes, **XYZ**, are fixed to the antenna and move about with it. The Y axis points to the satellite. The black axes, East, North and Up, or **ENU**, are fixed to the ground but oriented with magnetic North at our location. The blue vectors **M** and **G** are the ones measured by the sensor and the green lines are the projections of the sensor's X and Y axis onto the ground **ENU** axes. Using vector arithmetic and just a little bit of inverse trigonometry we can calculate the two angles we need.

So far the only mathematical assumptions we have made are that the ground is relatively horizontal, say less than 60 degrees inclination and that the **M** and **G** vectors are not parallel. That should be valid

anywhere on the Earth except near the magnetic poles or on the side of a steep mountain. So we won't be setting up there!

## Hardware

All components were readily available either on-line or from local electronics stores. None are particularly critical and can be changed to suit your requirements. Every effort was made to reduce the price of the final product to around \$100.

The rotator was designed to handle an Arrow Antennas model 146/437-10WBP dual band handheld satellite Yagi. This antenna has three VHF elements and seven UHF elements, weighs 600 g and requires 18 kg.cm of torque to lift it at the handle.

The most expensive single item required was the IP66 diecast aluminium enclosure (171x121x55mm, \$35).

The DC motors (model GW-370, 12 V DC, 0.6RPM @ 20 kg.cm,

right-angle worm-gear drive, \$17 each) were chosen for their high torque, very low speed and positive breaking characteristics.

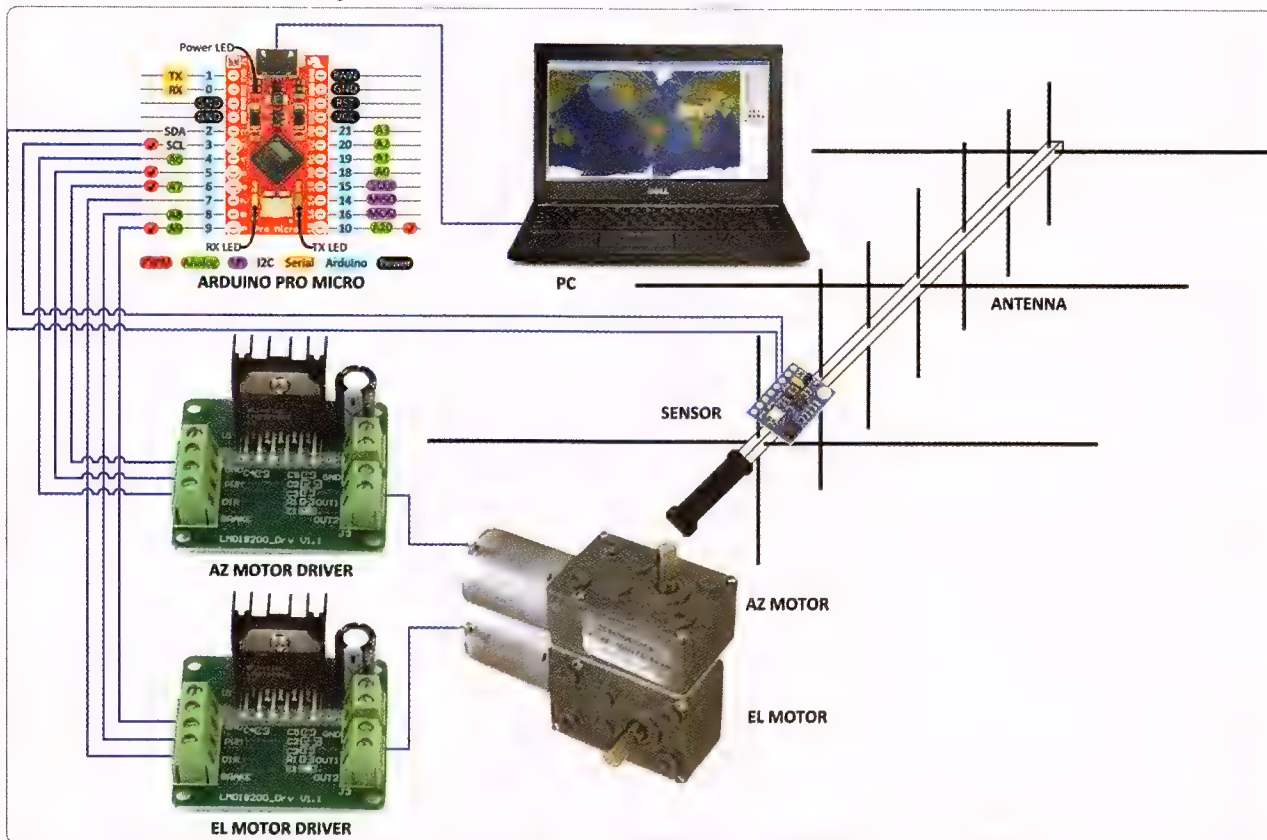
The DC motor drivers are pre-assembled LMD18200 boards (3 A, H-Bridge, \$15 each). They drive 12-48 V DC motors. Importantly, they have 5 V PWM, direction and brake control inputs..

The MEMS sensor array is the STMicroelectronics LSM303D. Actually, we used a 10 Degree-Of-Freedom sensor board with an integrated LSM303D accelerometer/magnetometer, L3GD20 gyro and BMP180 barometer/altimeter (\$11). The last two components are not used in this project. Note: The software does not currently support any other type of MEMS sensor (even the LSM303DLHC), but it could be easily modified to do so.

The microcontroller is a 5 V/16 MHz Arduino Pro Micro compatible (\$7).

A pictorial schematic diagram is shown in Figure 2.

Figure 2: Pictorial Schematic Diagram.





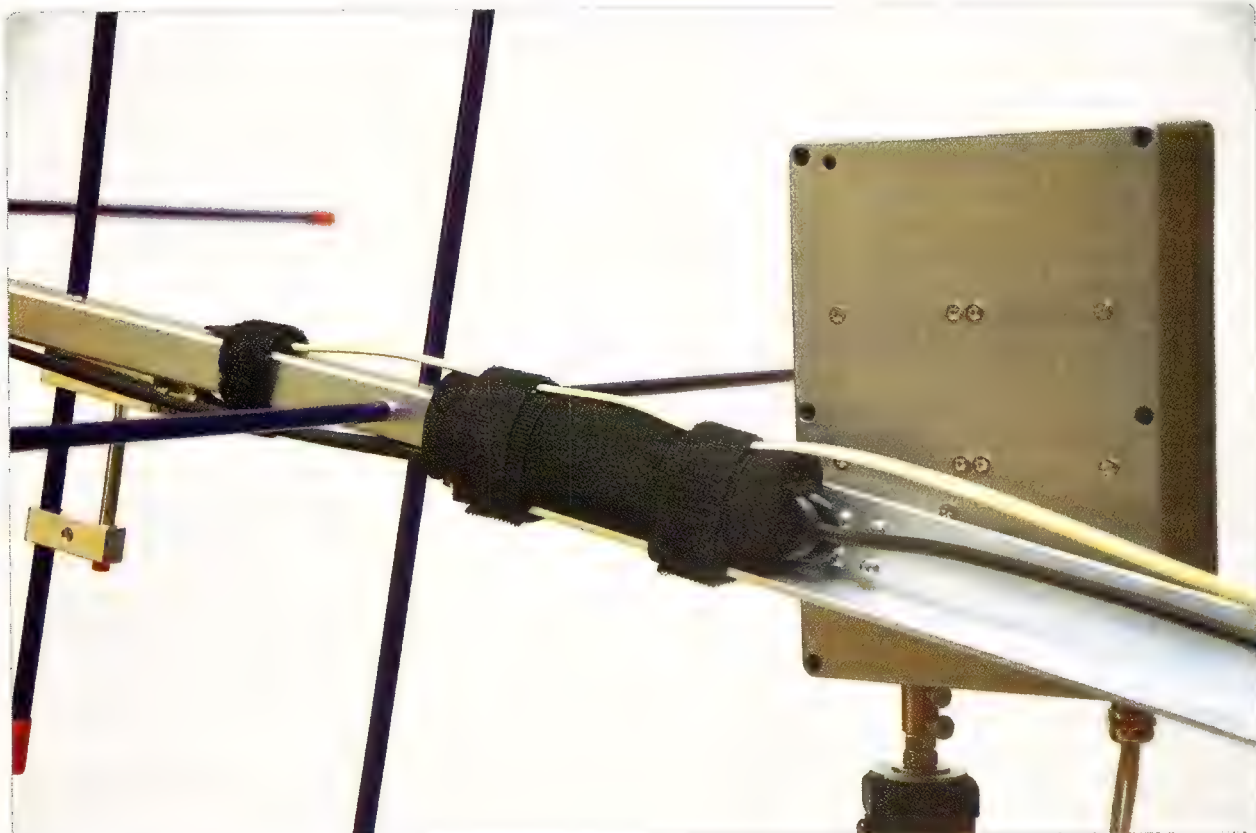


Photo 3: Antenna and Lift Arm.

## Construction

Construction was straightforward. The motors, drivers and controller were all mounted in an IP-66 diecast enclosure. The two motors were mounted at right-angles and as close as possible to each other to reduce the torsional moment between them. Extra washers were fitted to one side of the azimuth motor to counteract the chamfer on the sides of the diecast box. O-rings were fitted to the motor shafts for ingress protection. Threaded posts were used to mount the drivers. The controller, which was fitted with wire-connectors, was mounted using double-sided tape.

## Software

The rotator controller software is written in the C/C++ language. It was developed using the Arduino Integrated

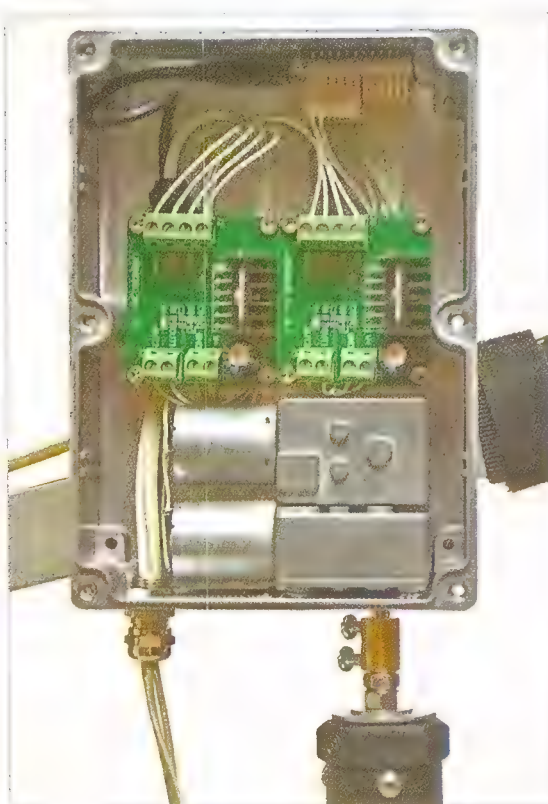


Photo 4: Construction details.

Development Environment (IDE) on a PC. The software is compiled on the PC and then uploaded to the rotator via the PC USB port. The same USB port is also used for remotely controlling the rotator from the PC.

When the software starts it initializes the controller and reads any stored calibration data from the internal EEPROM. It then moves the antenna to the home position.

The microcontroller reads the data from the sensor using a 2-wire Inter Integrated Circuit (I2C) interface and it controls the motor driver boards using discrete digital outputs for PWM (speed), direction and brakes.

The software processes positioning commands received from the PC. It computes the shortest direction to the required



antenna position. It controls the motor speed, direction and electric braking to smoothly start and stop the antenna movement.

An anti-windup algorithm keeps track of the number of azimuth rotations completed since start up to avoid cable tangles. Any rotation of more than 450 degrees will force the rotator to return to the home position before resuming remote control. The same occurs at the end of each pass.

The software responds to remote control commands and provides feedback over the USB port. The USB port should be configured for 9600,n,8,1 serial operation.

The rotator can also be controlled manually by a serial terminal application running on a PC. In our case we used PuTTY 0.62.

The software supports a range of single-character user commands including: (r)eset, (c)alibrate, (a)bort, (s)ave, d(e)clination, (d)emo and (m)onitor.

The rotator can be controlled by an automatic satellite tracking application running on a PC. In our case we used GNUpredict 1.4 and hamlib 3.0 (which also supports CAT rig control for automatic Doppler correction). The controller supports the AMSAT EasyComm II rotator control protocol. It provides real-time feedback of the antenna position, which is displayed on GNUpredict.

## Setup

**Caution:** Like any autonomous machinery, the rotator can move without warning and the attached Yagi antenna is a particularly prickly beast. So please ensure that it is operated safely at all times. Appropriate signage and keep-out tape is mandatory for public exhibition. A big, red, 12 V DC safety cut-off switch is also recommended.

The rotator's azimuth-motor shaft must be mounted on a very sturdy tripod – in our case we used

a heavy duty speaker support tripod. The antenna is attached to the lifting arm with double-sided Velcro straps and it is balanced by adjusting the counterweight. The lift arm and antenna assembly is then attached to the rotator's elevation-motor shaft using the 6 mm shaft hub. The sensor is attached to the antenna boom with Velcro, carefully orientating it along the boresight. Velcro is also used to keep all control and RF cables out of the way of moving parts.

When it is safe to do so the rotator is attached to the PC via the USB cable and a 12 V DC battery. The antenna will immediately move to the home position of zero degrees azimuth and elevation. Be prepared to kill the 12 V DC supply if there is any problem.

## Calibration

Prior to first use, the local magnetic declination must be entered and the sensor's magnetometers and accelerometers need to be calibrated. This procedure is only required once unless the configuration is altered.

First the local magnetic declination is entered using the "e" command: e.g. e11.6<ret>.

Then calibration is started with the "c" command. Each axis of the sensor is carefully hand-rotated alternately in line with and directly opposing the Earth's magnetic field and the Earth's gravitational field (that is twelve positions in all) sufficient to capture the absolute maximum or minimum values at each of these points. Note that any bumps to the sensor will upset the accelerometer calibration.

The calibration is aborted or saved to EEPROM using the "a" or "s" command.

## Operation

The rotator can be used manually by simply entering the azimuth and elevation angles separated by a space.

A cyclic rotator demonstration program can be started using the

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6SC7	\$17.00	12BA6	\$11.00
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6EV6	\$8.00		
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6CX8	\$8.00		
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6BN8	\$15.00		
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**73,  
Stephen VK2ASC**

"d" command. A debug monitor can be activated using the "m" command.

The rotator can be used automatically by starting a satellite tracking application with rotator-control capability on the PC. A satellite and rotator type is selected for tracking and then the controller is engaged. The antenna will move to the required azimuth position and will begin tracking elevation when the pass starts.

## Results

The accuracy of the rotator is dependent on good calibration





Photo 5: On The Air with SO-50.

and has not been the subject of very extensive investigation. Better than  $\pm 5$  degrees appears to be achievable. The resolution and repeatability are less than one degree. One failing of the system is that the antenna is not circularly

polarised and some fading occurs.

The antenna rotator makes for a great demonstration of amateur satellite operation. It clearly illustrates that the signals being heard are indeed coming from the sky and are moving along with the selected satellite.

It keeps the antenna pointing in the right direction especially during blind transmitting periods. There is no longer any fatigue for the children and much less stress for us coordinating the activity.

For an even more appealing demonstration we run GNUMpredict and hamlib on a small Raspberry Pi 2, Linux computer. Together with the rotator, an LCD monitor, keyboard, mouse, an FT-817 transceiver and CAT cable, the whole setup can be powered by a single 20 W solar panel.

### More information

For more details about this project simply email the authors at [info@sarcnet.org](mailto:info@sarcnet.org). We will send you more detailed build notes, parts lists, vendor links, software source code, installation and calibration instructions.

## A bush war-time station – almost!

### VK3BM's story in his own words

*Bruce Mann VK3BM & Peter Wolfenden VK3RV*

When the Japs bombed Darwin in 1942, a car load of radio inspectors arrived at the farm and said, 'How long would it take to get your rig going again if we gave you the impounded parts back? - 24 hours?' Vital parts out of the transmitter had been locked up in the Post Office. They said "The reason for our visit is that everywhere the Japanese have been previously, they had a plan. They knew exactly what they were going to do, where they could do the most damage to us". He said, "All our military communications are at one point. One well-placed bomb could stop the lot. We know just

how good your equipment is," with a grin.

He said, "We would like to know if you would be willing to let us take it over in case this eventuates." I said, "Oh, yes." They made queries. They looked at the sheds, and the power plant and antenna. They said, "It was absolutely ideal. First of all the Japanese would not expect a radio station away out here, [Quambatook, NW Victoria near Swan Hill] no power, no power lines, but you have a nice diesel generating plant of your own."

"The wire antennas are completely invisible from the air and you have those sheds where we can set up

comfortable accommodation for the staff that have to work around the clock." They would take care that they would do nothing external to the shed that would indicate that it was occupied. It was an ideal setup. I agreed that if it became necessary that they could take it over. Fortunately the Japanese had not planned to invade Australia, and their bombing of Darwin was almost their last effort against mainland Australia.

[Extracts from *A Lifetime Hobby* by Bruce Mann VK3BM, OTN Journals #14 and #15, 1995, courtesy Radio Amateurs Old Timers Club]  
Peter Wolfenden VK3RV, WIA Historian



# Product Review | FTM-100DR 144/430 MHz Dual Band Transceiver

Peter Hartfield VK3PH



Photo 1: FTM-100DR 144/430 MHz Dual Band Transceiver.

The FTM-100DR 144/430 MHz dual band mobile transceiver is one of the latest in the Yaesu System Fusion range.

## Features

- 144/430 MHz dual band transceiver with automatic detection of FM/C4FM digital communication mode
- Wide band receiver in the 108 MHz to 999 MHz range
- Transmit power of 50/20/5 W selectable
- Separable LCD front panel complete with separation cable and mounting bracket
- 1000 memory channels split between the A Band and B Band
- Supports micro-SD card for programming, backup and cloning to other transceivers
- VFO or memory scan functions
- Built in GPS receiver for display of location and movement information
- APRS function built in for communication of location and messages
- Group monitor function for information exchange between frequently communicating groups
- Support for Yaesu's WIRES-X internet linking function
- Optional Bluetooth adaptor for hands free operation
- Optional voice guidance unit provides voice announcements and recording of received audio

## In the box

- The main unit with detachable head
- DTMF microphone (MH-48A6JA)
- Fused power cable with bare

- ends for connection to the mobile power supply (the connector at the transceiver end is a standard 2 pin auto plug and two spare fuses are supplied)
- Mounting brackets and screws for both the transceiver and the remote head
- Manual (which is also available to download from the Yaesu web site in PDF format)
- Programming cable (SCU-20) – this is a huge addition to the box as the programming software is also available for download from the Yaesu web site
- Stereo to mono plug for connection to the external speaker jack
- 3 m controller cable (for remote head separation)



## Installation

I also acquired the Bluetooth option (BU-2) as the microphone plugs into the main unit, not the detachable head. More about installation of the BU-2 option later. As I'm replacing an FT-7900 in the vehicle with this transceiver, I will make some observations and/or comparisons with that model.

The first observation is that the mounting brackets are identical in size and the screws are interchangeable. It was very easy for me to remove the FT-7900 and fit the FTM-100DR in its place (mine is mounted under the front passenger seat). The antenna connector is a UHF type socket unlike the FT-7900 which has an N socket. I used an adaptor (N socket to UHF plug) for connection to the antenna so as not to have to change the antenna connector. The power cables are identical, so no problems with that connection.

The remote head mounting bracket comes with a double sided adhesive sheet that is designed to stick to a flat panel on top of the dash. I had the head of the FT-7900 mounted on top of the centre console located just in front of the gear shift. I'm using Velcro strips stuck to both the console and the back of the remote head so it can be easily removed. I continued to use this method with the FTM-100DR. Then I connected the remote head to the transceiver with the supplied controller cable.

The microphone plugs into the front of the main unit. This was not very convenient for me. With the main unit mounted under the front passenger seat, the curly microphone cable is way too short. You can purchase extension cables which have a 6 pin (RJ12 / 6P6C) connector at each end although I discovered that the head extension cable I had for the FT-7900 was interchangeable. I plugged one end into the microphone socket on the transceiver, the other end into a CAT6 joiner with the Microphone on the other end of the joiner. Powered up the transceiver and I'm on air.

I installed the Bluetooth module in the main unit earlier however I decided that the microphone provides more flexibility because of the buttons it provides to operate the transceiver (more about this later). To install the Bluetooth unit, remove the cover, disconnect the speaker and remove the front panel and the Bluetooth unit pushes onto a socket at the front of the transceiver. The process is reversed to replace the covers - a fairly simple process.

To check the operation of the Bluetooth unit, I found an old mobile phone Bluetooth headset, paired that with the transceiver and it worked as expected first time. You may need to change the Bluetooth PIN in the transceiver to match the device with which you are pairing. I also configured the transceiver so that the answer button acted as a PTT

toggle switch (i.e. push to transmit, push again to return to receive).

## Operation

Programming software is not required to configure the transceiver although I would highly recommend using it due to the many features available and the complexity. As already mentioned, the programming cable is provided and the software is downloadable for free from the Yaesu web site. When the transceiver is first powered on, you will be asked to enter your Callsign. The LCD screen will basically guide you through this process using the main control knob to select the required letters. Up to 10 alphanumeric characters can be entered including a hyphen.

To turn the transceiver on, press the power button for over 2 seconds and the LCD screen comes to life. To turn the transceiver off, press the power button again for over 2 seconds or you can configure the auto power off feature to turn the transceiver off after an interval of inactivity. I have mine set to 1 hour, although there are several settings available from 0.5 to 12.0 hours. A warning beep sounds about 1 minute before the transceiver turns off. Pressing any button at this point will reset the timer. This is a significant improvement over the FT-7900 which beeps continuously until the transceiver powers off.

The power button also doubles as a lock key to stop any accidental

Photo 2: Front panel.





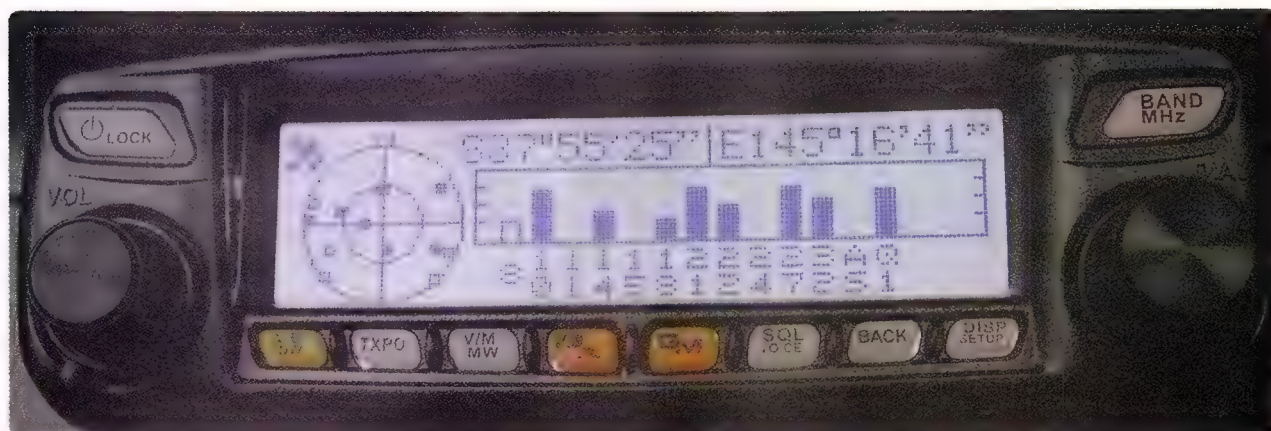


Photo 3: GPS Detail Display.

operation of the transceiver. Press the key momentarily to lock and again to unlock. The volume control is self-explanatory. On the right hand side of the front panel is the BAND MHz button. Pressing this button momentarily changes the operating band, pressing and holding for over 1 second allows the frequency to be adjusted in 1 MHz steps. The large dial on the right is for changing frequency, memory channels or selecting configuration options.

The other buttons on the front panel provide the following functions (in each case, select the first function with a momentary press and the second function by pressing and hold for over 1 second):

- A/B DW – switches between the operating Band A or Band B; toggles the dual watch function on and off
- TXPO – toggles the transmission power setting between 50/20/5 W output; toggles the signalling setting (tone on/off etc.)
- V/M MW – toggles between VFO and memory mode; enters the memory registration screen
- DX – switches the operating band communication mode (FM/C4FM etc.); activates the WIRES-X function
- GM – activates the group monitor function; displays the logging screen
- SQL VOICE – press to adjust the

squelch level with the main dial; activate VOICE mode (when the optional FVS-2 is installed)

- BACK – enables the selected value and returns to the previous screen
- DISP SETUP – switches the information display between your location, received station location or GPS info screen; enters the SETUP menu

The supplied microphone (MH-48A6JA) also supports most of the above functions so that the transceiver can be operated without touching the front panel. In addition, there are four function keys that can be programmed to perform your most commonly used functions.

The transceiver is not a true dual band receiver as it will only receive on one frequency at a time. To work around this, it provides a dual watch capability that periodically scans the home channel of the current band at an interval of from 0.3 to 10 seconds (selectable). The dual watch function can be toggled on and off from the front panel.

### Built in GPS

The GPS reception antenna is located in the detachable front panel (top centre). For this reason, it is recommended that the front panel is mounted on the dash or at the front side of the centre console (which is where mine is mounted) to gain a clear GPS signal. The strange looking icon in the top left

hand corner of the screen indicates a GPS lock (flashing means finding the GPS signal and stable means GPS locked).

The compass displays the direction of travel which can be configured as either North up or heading up. Alongside the compass is the direction (N, S, E, W, etc.) and the current speed in km/h. Pressing the DISP button will display detailed GPS coordinates and heading direction. This can be switched between my station (MY) and the received station (YR), assuming there is another station transmitting using the C4FM mode – more about this later.

The FTM-100DR has a built in clock. The date and time can be set manually or automatically when a signal is received by the GPS. Make sure you set the time-zone correctly; there is no automatic adjustment for daylight savings time. The sub display can be configured to show the sub band frequency, clock or voltage. I prefer to see the sub band display with repeater Callsign displayed.

In C4FM digital mode, the GPS location information and voice signals are transmitted simultaneously. Therefore, the direction and location of the received station can be calculated and displayed in real-time, even while communicating. When such a signal is received, the transceiver displays the Callsign, bearing and



distance to the received station on the LCD screen.

The transceiver has a function that enables GPS information to be logged to the micro-SD memory card (when one is installed). This saved information, for example, can be extracted at a later date using a personal computer to import into mapping software to display the route travelled.

## Programming the transceiver

There are a few options available for programming the transceiver. The most basic option is via the front panel. You will probably want to load it with a large list of local repeaters therefore I would highly recommend using programming software. After all, the transceiver comes with a programming cable and the Yaesu software can be downloaded from their web site for free.

I use RT Systems software for programming all of my transceivers; therefore I downloaded a copy of the FTM-100DR radio programmer which cost me \$25 USD (\$35 AUD). The RT Systems software will work with the Yaesu supplied cable or a micro-SD card. The FTM-100DR is not yet listed on the CHIRP web site although I'm sure it will appear soon given the popularity of this software.

The best place to get the latest repeater files is from the WIA web site. There is a CSV file available that can be massaged and imported directly into the programmer. When

you run the programmer, you will notice that there are two bands available (Band A and Band B). Yaesu has decided to remove the memory bank functionality from this transceiver to help reduce its complexity. I personally think this was a wrong move because organising memories into banks is great for travelling and grouping favourite channels together.

I initially configured all of the 2 m repeaters for VIC (50 of) in Band A and 70 cm repeaters (65 of) in Band B. Having used the transceiver on the road for a few weeks, I think I'll move everything to Band A and program my favourites into Band B. This will make for quicker access to the channels I use regularly and enable me to scan my favourites. This approach may seem a bit wasteful as I will have about 10 favourites occupying space that can accommodate up to 500 channels. I have roughly 115 repeaters and 5 simplex channels programmed into memory. The 500+500 available memory channels will be more than adequate for most users in Australia.

In addition to the Band A and Band B memories, there are nine pairs of limit memories that can be programmed for each band; five home channels and the initial VFO frequencies can be set. All of the other functions can be set via tabs on the menu settings window. There are too many functions to go through here. Once you have saved the

transceiver configuration, you have the option of communicating with it via the supplied cable or saving the configuration to a micro-SD card.

## Micro-SD card

The micro-SD memory card slot is located at the front of the main body. The letters SD are displayed on the front panel when a card is detected in the transceiver. Note that a micro-SD card is not supplied with the transceiver. The micro-SD card can be used for the following functions:

- Backing up the information and settings of the transceiver
- Saving GPS log data for use in a personal computer
- Saving data downloaded using the GM and WIRES-X functions
- Exchanging data with other transceivers

The transceiver supports micro-SD cards from 2 GB to 32 GB in size. According to the manual, not all commercial micro-SD cards will work and the card must be initialised in the transceiver to ensure proper operation. I used an 8 GB SanDisk Ultra without a problem. The transceiver supports the FAT32 file system. Note that if you format the card in the transceiver according to the initialisation procedure, all data on the card will be lost.

The micro-SD card is a very convenient way to program or re-program the transceiver after it has been installed in a vehicle. It is a

Photo 4: Configuration screen.







Photo 5: APRS Weather Information.

much easier alternative to removing the transceiver or having to take your laptop and cable out to the vehicle. Simply insert it in the transceiver, select write to micro-SD card and remove it. Insert the micro-SD card into a personal computer. The programming software allows you to read from it, make whatever changes you need and then write back to it. Re-insert it into the transceiver, perform a read from micro-SD card and you are up and running with the changes you just made.

### C4FM digital mode

As you can see, this transceiver is packed with features, but the main attraction is the C4FM digital mode. The FTM-100DR transceiver is equipped with an Automatic Mode Select (AMS) function which automatically selects one of four transmission modes depending on the signal received. If AMS is off, the mode can be set manually:

- DN (voice / data simultaneous transmission mode) – This is the standard mode for C4FM digital. Transmission is less prone to interruptions due to detection and correction of voice signals. GPS data (if available) is transmitted along with the voice data and the transmitting stations Callsign. The LCD screen will display the Callsign and distance to the received station (if GPS data is available).
- VW (voice full rate mode) – digital voice data is transmitted

using the full 12.5 kHz bandwidth which enables high quality voice communication

- DW (high speed data communication mode) – data is transmitted using the full 12.5 kHz bandwidth for image and message transmission
- FM (analogue FM mode) – standard FM mode of transmission which supports communications with stations not able to transmit using a digital mode.

Compared to other digital modulations within FDMA, C4FM has excellent communication quality, Bit Error Rate (BER) characteristics. Presently, C4FM is the standard method for professional communication devices in FDMA, and is therefore expected to continue to be the main stream digital communication in the future.

On air, the number of repeaters and users of C4FM devices is starting to grow. I have had many contacts while testing this transceiver and I can say that the audio quality certainly lives up to expectation both through the local repeaters and via simplex communications. The ability of the transceiver to drop back to conventional FM mode when it hears one of these signals is simply amazing.

I understand that sales of C4FM repeaters (DR-1X) in Australia are growing as this mode of communication becomes more popular here. As Editor of the *WIA Callbook*, I have asked the National Repeater List

Coordinator if we can identify these repeaters in next year's *Callbook* so that people know where to find them.

I live in Lysterfield, Victoria. The local repeaters are as follows:

- VK3RFY 438.400 MHz Tone 91.5 Hz Hillside, Melbourne FM/C4FM EchoLink/IRLP
- VK3RGW 438.500 MHz Tone 91.5 Hz Grovedale, Geelong West FM/C4FM
- VK3RDX 439.600 MHz Tone 91.5 Hz Mt Waverly, Melbourne FM/C4FM
- VK3RBY 439.625 MHz Tone 88.5 Hz Bayswater, Melbourne FM/C4FM

Unfortunately, I can't tell you where to find the other ones although I know there are several in NSW, QLD and WA.

### APRS feature

The Automatic Packet Reporting System (APRS) was developed by Bob Bruninga WB4APR and is an amateur radio based digital communications system for local, tactical, real-time exchange of information among all members of a net, including map based displays for situational awareness.

Upon receiving an APRS signal from another station, information such as the identity, direction, speed and distance to that station can be displayed on the screen of the transceiver. Additional data such as messages and weather information can also be exchanged.

I have not used APRS before, so



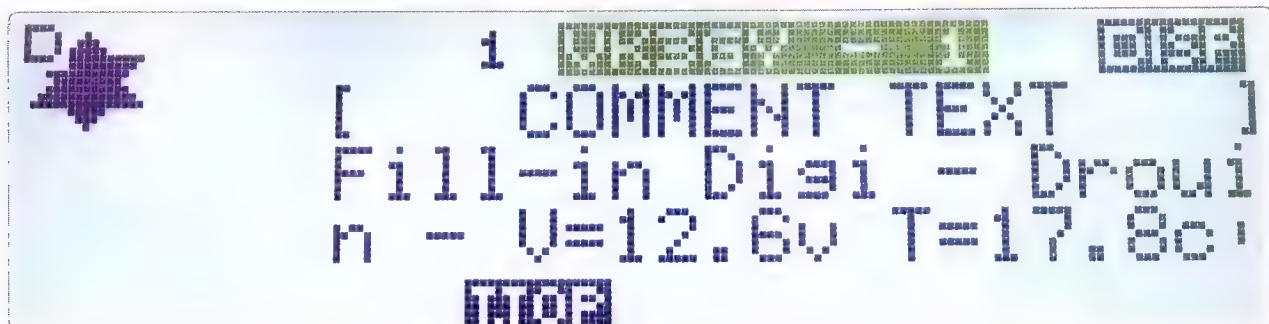


Photo 6: APRS Digi-repeater Indication.

this was a learning curve for me. In the end though, it was fairly easy to setup once I found the right frequency (145.175 MHz) and baud rate (1200 baud). Turning on the APRS modem suddenly brought the transceiver to life displaying station information as far away as VK5, VK7 and VK2. Turning on the auto beacon feature enabled me to contribute my position.

One small note of caution, remember to turn off the beacon function before changing frequency otherwise you might bombard other amateurs with a horrible noise (especially if you are moving to a repeater). The configuration options for APRS are quite extensive therefore I won't go through them here. Suffice to say Yaesu provides a separate instruction manual for APRS that is available for download from their web site.

### WIRES-X feature

The WIRES-X feature is a system that links to other users via the internet which enables communication worldwide regardless of the distance

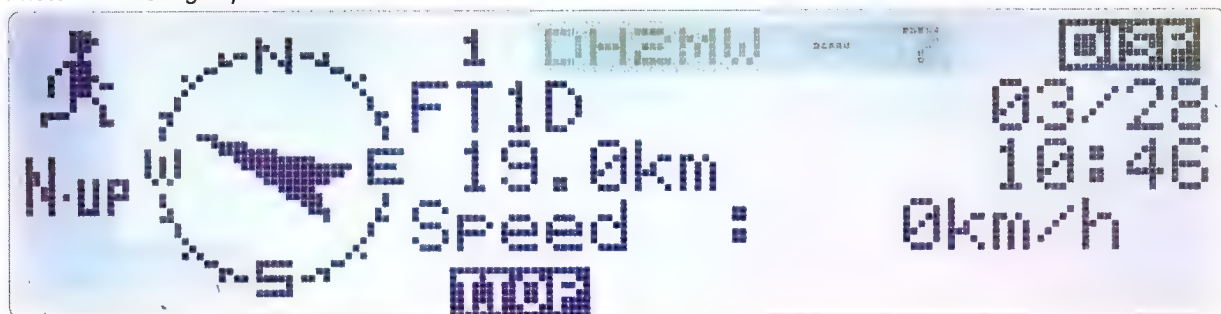
### Specifications – General

Frequency range	TX	144 – 148 MHz 430 – 450 MHz
	RX	108 – 137 MHz (Air Band) 137 – 174 MHz (Incl. Ham) 174 – 400 MHz (GEN1) 400 – 480 MHz (Incl. Ham) 480 – 999 MHz (GEN2)
Channel steps		5/6.25/8.33/10/12.5/15/20/25/50/100 kHz
Emission type		F1D, F2D, F3E, F7W
Frequency stability		+2.5 ppm -20oC to +60oC
Antenna impedance		50 Ω
Supply voltage		Nominal 13.8 VDC negative ground
Current consumption		0.5 A receive 12 A transmit (50 W TX)
Operating temperature		-20oC to +60oC
Case size		Radio unit: 140 x 45 x 164 mm Front panel: 140 x 45 x 29 mm
Mass		1.1 kg total

### Specifications – Transmitter

RF power output	50/20/5 W
Modulation type	F1D, F2D, F3E: variable reactance modulation, F7W: 4FSK (C4FM)
Spurious emission	At least 60 dB below
Microphone impedance	About 2 kΩ
Data terminal input impedance	About 10 kΩ

Photo 7: APRS Digi-repeater Indication.





## Specifications – Receiver

Circuit type	Double conversion super-heterodyne
Intermediate frequencies	1st 47.25 MHz, 2nd 450 kHz
Receiver sensitivity	108 – 137 MHz (AM) 0.8 $\mu$ V typ. for 10 dB SN 137 – 140 MHz (FM) 0.2 $\mu$ V for 12 dB SINAD 140 – 150 MHz (FM) 0.2 $\mu$ V for 12 dB SINAD 150 – 174 MHz (FM) 0.25 $\mu$ V for 12 dB SINAD 174 – 222 MHz (FM) 0.3 $\mu$ V typ. for 12 dB SINAD 222 – 300 MHz (FM) 0.25 $\mu$ V typ. for 12 dB SINAD 300 – 336 MHz (AM) 0.8 $\mu$ V typ. for 10 dB SN 336 – 420 MHz (FM) 0.25 $\mu$ V for 12 dB SINAD 420 – 470 MHz (FM) 0.2 $\mu$ V typ. for 12 dB SINAD 470 – 520 MHz (FM) 0.2 $\mu$ V for 12 dB SINAD 800 – 900 MHz (FM) 0.4 $\mu$ V typ. for 12 dB SINAD 900 – 999 MHz (FM) 0.8 $\mu$ V typ. for 10 dB SINAD
	<b>Digital mode</b>
	140 – 150 MHz (Digital) 0.19 $\mu$ V typ. For BER 1% 420 – 470 MHz (Digital) 0.19 $\mu$ V typ. For BER 1%
Selectivity	NFM, AM 12 kHz / 30 kHz (-6 dB / -60 dB)
AF output	3 W (8 $\Omega$ , THD 10%, 13.8 V) internal speaker
	8 W (4 $\Omega$ , THD 10%, 13.8 V) optional MLS-200-M10
AF output impedance	4 – 16 $\Omega$

between stations. To establish a WIRES-X node, the WIRES-X connection kit (HRI-200) is required. As I didn't acquire one of these kits, I

was not able to review this function (I may be able to make it the topic of a future review).

## Conclusion

The FTM-100DR 144/430 MHz dual band transceiver is a compact mobile device that manages to pack a huge amount of functionality into a very flexible package. In addition to the normal functions you would expect from an amateur transceiver of this nature, it supports digital (C4FM) mode, APRS, GM (group monitor), WIRES-X, Bluetooth (option) and comes equipped with built in GPS. In addition, it comes with a programming cable, remote head separation kit (3 m cable and bracket) and a micro-SD card slot for backup, programming and storage of data.

## Acknowledgements

I would like to thank Akiko Shiragami from Yaesu Japan for her support and rapid turnaround for answers to my questions during this review. I would also like to thank Ross Keogh from Strictly Ham in Bayswater for the supply of all equipment for the review. I will be reviewing the FT2D dual band digital handheld in an upcoming issue.

## Over to you

### Recruiting new amateurs

To the Editor AR,

After reading the comment in *AR* April by Rob VK3NBC, I would like to share my views on the subject of recruiting new members and to address some of the statements made by Rob.

Firstly there has been a portion of amateurs who have the view that the introduction of the Foundation licence is a "dumbing down" of the standards required. Let me state clearly here I do not support that view at all. I believe this has been a great step forward for the hobby and has encouraged many new hams into the hobby who would have never otherwise joined our ranks. Now the clear goal here is also that these new hams go on and through exposure to others more experienced in radio continue their education and upgrade to Standard or Advanced licences. I am pleased to say I personally now many "F" calls that have done just that. The important point here is most would never have done this as to go straight to the old novice or limited call would have seemed too daunting so was never attempted yet here they are now as standard or advanced calls. So the idea of the Foundation licence as a stepping stone does indeed work.

As to those Foundation calls who do not ever upgrade, fine they are on the air participating in our hobby, out at special events and field days etc. They continue to add to our ranks and enjoy what they are doing within the limits of their privileges, no problem with that at all.

Now where I do disagree with Rob's comments is with that of his statement "We need to grow. If the system needs to be made easier for this to happen so be it", he goes on to say "if the powers at be decided to give every Foundation holder an upgrade to Advanced tomorrow, it would not bother me as long as they know and understand the regulations". Really, seriously Rob? There is a reason that there is a technical component to gaining access to using radio equipment, would you really see it as a good idea that those with little proven (this is what an exam does in the main) knowledge of electrical and radio theory have access to high powered transmitters of up to 400 watts? Even 50 or 100 watts into a high gain antenna at VHF or UHF frequencies is capable of vastly exceeding safe EMR limits not mention the potential

for other problems with interference to other services with poor installation practices.

The other point is our hobby is about the "investigation of art and science of radio" to quote a term from the ARRL but one that I feel is very appropriate. If we remove all entry requirements are we then attracting persons who are genuinely interested in radio technology or persons who can simply afford to pay the licence fee? This is the core of our hobby and if that test of real interest is taken away then I see that we are no longer a group of like-minded people and would cease to exist as a hobby.

For those with learning difficulties there is much help already given, there are many very patient volunteers who will help those they can through the process and where necessary the exams are read out and answered verbally. That said though if the applicant truly cannot grasp just the basics required in the Foundation course then at the risk of seeming arrogant they are simply not suited to our hobby.

Regards,  
Stuart Jones VK2ZX.





# A battery for the Universal AVOMETER Model 8 Mk III

Peter Kloppenburg VK1CPK



Photo 1: AVO 8 meter.

Have you tried finding a 15 volt battery replacement for the above-mentioned AVOMETER?

Here is the story of my successful attempt to make up my own 15 volt battery using five Lithium 3 volt batteries, an old valve shield, and two five-cent pieces to create a suitable replacement.

## Introduction

AVO LTD used two batteries in the AVO 7 and AVO 8 models. They

were the well-known 1.5 volt "A" type battery and the EVEREADY 15 volt "No 411" type battery. The latter is used only in the high resistance range of 20 megaohms. The "No 411" type has gone out of production many years ago because those large and heavy Bakelite multimeters no longer suited technicians who wanted cheap and efficient digital multimeters that are light enough to carry in one's shirt pocket.

As the original "411" battery was small, only 31x25x16 mm, and the available space in the battery compartment is only 51x37x40 mm, a replacement 15 volt battery would have to fit within the latter dimension.

## What to do

Five Lithium 3 volt batteries Type CR2032 in series would provide the 15 volts required to operate the High range of the multimeter.

Searching the junk box, I found an old valve shield mounted on a 7-pin valve socket. Discarding the socket, I noticed the spring inside the valve shield. The spring would exert pressure on the five stacked lithium batteries held within the valve shield.

First, I covered the inside of the valve shield with a piece of thin insulating sheeting. Then, taking two pieces of insulated wire, one black, one red, I soldered each of them to a five-cent coin, in the centre of each. They would serve as end connections to the battery stack. (Editor: The use of current coinage in such a manner may not be legal. I am sure that any reader

Photo 2: Type 411 battery.





wishing to solve this or a similar problem could find an alternative conductive metallic disk.)

In order to prevent the battery stack from falling out of the open end of the valve shield, I drilled two small holes opposite one another at the open end of the valve shield. They would hold a small bolt fitted with insulating tubing, to prevent the stack from falling out.

Before placing the battery assembly into the multimeter, it is necessary to increase space for it by removing the two clamps that were used to hold the "411" battery in place and connect it to the multimeter's circuitry.

To do this, remove the screws that hold the platform containing meter movement and switches. Remove the battery compartment cover and then undo the screws that hold the battery compartment in place.

Replace the battery clamps with solder lugs.

## Final assembly

1. Cover inside of valve shield with thin layer of insulating material.
2. Thread the black wire with coin through the spring towards the top of the valve shield.
3. Insert five Lithium batteries with negative side toward coin with black wire.
4. Place coin with red wire on top of battery stack.
5. Insert small bolt with insulating material through holes in bottom of valve shield.
6. Place assembly in battery compartment and solder red and black wires to respective solder lugs.
7. Re-assemble AVO meter and test High ohms range.



Photo 4: AVO 8 Battery replacement components.

are able to measure resistances up to 20 megaohms, currents up to 10 amps, and voltages up to 2500 volts, AC or DC. AVO meters have a place on the workbench where they can measure the operating conditions of linear amplifiers, sound levels in audio systems, or the currents feeding 12 volt DC receiving systems.



Photo 3: AVO 8 Battery replacement components.

## Expenditure

The price of five Lithium 3 volt batteries. Type CR2032

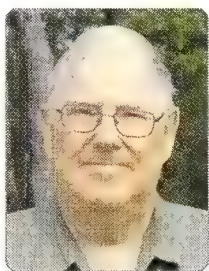
## Summary

Restoration of the High range of the AVO 7 or 8 models provides satisfaction for being able to restore the usefulness of a very reliable piece of test equipment. As described in this article, it is not difficult to update old style multimeters using a bit of ingenuity and a willingness to adapt. Many of the AVOs



Photo 5: AVO 8 Battery replacement ready to install.





## VK2news

Tim Mills VK2ZTM  
e vk2ztm@wia.org.au

ARNSW had their AGM on Saturday 30 April. The existing committee re-nominated so a ballot was not required. In the month of May, there are Foundation courses at Waverley ARS on the weekend of the 14th and 15th. ARNSW is the following weekend the 21st and 22nd. For bookings email their education sections. The Trash & Treasure is on Sunday 29th. Check on the home page of ARNSW for major items on offer.

On Easter Sunday the VK2WI Morse transmission on 3699 kHz got an injection of new text which doubled its memory to about 8000 words. Have a look at the item in the April AR CW column by VK5EEE which explains this facility. This facility had its origin in the early 1970s when Barry VK2AAB developed a 2 metre system with a disc fed computer working with a recently acquired 2650 IC. It was installed on a building at Turramurra. Thoughts then turned to adding an HF transmission and 80 metres was chosen. It took years to obtain approval because it was a transmission which could go beyond Australia. The frequency of 3699 kHz was chosen as it is the upper limit of the VK band and no voice transmission should be that close to the band edge. Approval was finally granted and it was added to the 2 metre unit. The large building had a tiled roof with the ridge caps having some holes in the vertical section. A half wave 80 metre dipole was woven along these holes.

After some years at Turramurra, the system was transferred to the HADARC repeater site at Asquith. In time the power costs became a

burden on the club and the system was offered to the NSW Division for operation from the Dural site. In the beginning both 2 and 80 metres were used - still with the computer and floppy disk source. An intermod. developed with an on-site packet system and the 2 metre service was terminated. A new memory and code generator was developed by Les VK2KYJ which is currently in use.

It's a month to go until the annual Oxley Region ARC Field Day at Port Macquarie on the June long weekend 11 and 12 June. This year its back at the newly refurbished Tacking Point Surf Life Saving Club Hall in Matthew Flinders Drive at the southern end of Port Macquarie. A dinner is held on Saturday night at the Port Macquarie Golf Club. Visitors requiring accommodation should book early; it's a popular town at any time. If in town - check in to the weekly nets on 146.700 on Thursday evening at 7.30 pm and 147.000 on Sunday morning at 9 am. The Oxley Region ARC UHF repeaters are on 438.425 and 438.525 MHz.

It's the time for some clubs to have their AGMs. In late February Fisher's Ghost ARC, based at Campbelltown in the south west of Sydney, held theirs. President Ian VK2ND, Vice President Frank VK2FRW, Secretary Lyn VK2FLMK, Treasurer Derrick VK2DEK and committee members Craig VK2KDP, Bruce VK2HAP and Peter VK2PR. They meet at various locations on the last Wednesday of the month, so check details on [www.fgars.net](http://www.fgars.net) or check in to the weekly net Thursday evening at 7.30 pm on 147.500 MHz simplex.

In March the Hunter Radio Group, who meet at NBN TV studios on the second Friday evening except December and January have as Patrons - Peter VK2ZTV and Charlie VK2CLH. President is Len VK2ZFD, Vice President Bill VK2GWG, Secretary/Treasurer Rodney VK2CN, repeater officer Greg VK2HT, Broadcast officer Tony VK2ABM, webmaster Charlie VK2CLH, Social secretary Ardel Prout, program officer Len VK2ZFD with helpers and beacon officer Grahame VK2FA. Their weekly broadcast net is on Monday at 7.30 pm on 146.900 MHz. They operate three repeaters at Mount Sugarloaf to the west of Newcastle on 146.900, 146.975 with EchoLink and 438.025 MHz. Also 6 metre beacon VK2RHV on 50.288 MHz.

WICEN NSW is providing communications to Alzheimer's Australia Memory Walk & Jog events with the Bay run at Drummoyne [Sydney] on 1 May, Albury-Wodonga on 22 May and Hunter on 29 May. The WICEN website is [www.nsw.wicen.org.au](http://www.nsw.wicen.org.au)

Westlakes ARC in the Hunter Region will have their AGM at the Club Rooms in York Street, Teralba on Saturday 14 May 2016 commencing at 1.30 pm. They are another club which commenced during the 1960s.

The ARNSW Radio Home and Experimenters Group for some years have had an evening get together. With recent falling attendances these gathering have been put on hold for the moment.

During the Depression in the 1930s, many suburban radio clubs were formed to be within walking distance from one's QTH. This



stopped largely with the war and after it the NSW Division appears to have been the main source of activity. The reach beyond Sydney was achieved by Branches. These were the Hunter Branch in Newcastle, along with the Central Coast, Blue Mountains and Illawarra. Beyond these areas in the country there were Zones with Zone Officers. Then along came repeaters which needed to be established by

local groups and this led to a rise in clubs being formed to apply for and manage these new systems. About the same time the various Branches ceased, to be replaced by a local club.

There are many clubs who can trace their origin back a long way, like Waverley ARS who will have their Centenary in 2019; Manly Warringah RS can find their origins in the Manly Radio Club about

1923. Oxley Region ARC at Port Macquarie is 45 years old, have been formed to set up a repeater. The Hornsby and District ARC is approaching 40, formed to cover the local population. Does your Club have a history which would make good reading within this magazine?

73

Tim VK2ZTM

## Oxley Region Amateur Radio Club Inc Port Macquarie NSW

**Presents the 41st Annual Field Days  
June Long Weekend  
Saturday & Sunday  
11-12th June 2016**



**Contact Field Day Co-ordinator: Henry Lundell VK2ZHE. Email: [vk2bor@orarc.org](mailto:vk2bor@orarc.org)  
Location: Tacking Point Surf Lifesaving Club Matthew Flinders Drive Port Macquarie.**

**General interest displays.  
Trash & Treasure Sunday only  
Trade displays Sunday only  
Fox hunts Saturday & Sunday**

**Entry only \$5**  
*[www.orarc.org](http://www.orarc.org) for more details*

**Field Day dinner Saturday night**  
*BBQ breakfast & lunch available  
Free coffee, tea & biscuits  
Soft drinks for sale.*

Oxley Region Amateur Radio Club Inc  
PO Box 712 Port Macquarie NSW 2444

Station Callsign VK2BOR

Talk-in frequency 146.700 MHz (91.5 Hz CTCSS)

## Over to you

### Portable operations

Like many others, I have found my ham radio niche in portable operations, and am active in various outdoor award schemes such as SOTA and WWFF.

Over the Easter long weekend I activated 6 parks for WWFF award purposes, and I was grateful toward those fellow amateurs who called, not because they were participating themselves, but just to help me make the numbers.

The World Wide Flora & Fauna (WWFF) award scheme is becoming popular in Australia among

both out-and-about activators and home-based award hunters. WWFF focuses on National Parks and similarly significant natural habitats. It has an enormous following in Europe, where it originated. They have a much larger amateur radio population 'over there', and the requirement for the activator to make 44 contacts to gain qualifying credit for each park is not seen as onerous. In the Australian context, with its much smaller population, reaching the 44 contacts can at times be very difficult. (The local VKFF award

programme sets a more appropriate threshold of 10 contacts, but many of us are still working toward the global awards as well.)

This is a note of appreciation to those amateurs who are not particularly interested in these award schemes, but take the time to call the activator anyway, just to help us reach the required contact count. You may not realise how much it means - thanks so much!

Nicholas ('Nick') Lock VK3ANL.





# VK5news Adelaide Hills Amateur Radio Society

Christine Taylor VK5CTY



*Photo 1: John VK5EMI and Tina operating in the bush. They were using an Inverted V antenna and had solar panels keeping the battery charged.*

March was a busy month for AHARS. The SOTA and the National Parks expeditions continue. Paul VK5PAS and John VK5BJE are busy along with Hans VK5YX and his YL, Lesley VK5LOL even venturing into Victoria for a weekend of contacts.

## NBN

The Club meeting on the third Thursday of the month was addressed by Stewart Bates on the hot topic of the rollout of NBN. This affects everyone who has a fixed telephone connection or who uses a computer. Apart from wishing to have an understanding of the

principles, we are all interested in when NBN is coming to our area and how it will affect us personally.

By 2020 it is planned to have the NBN system connected to 8 million homes and 10 million business premises. It is also expected to be making money by then, instead of costing money as it is doing in the rollout stage. The network will provide all computer users with a much faster Internet connection plus the benefits this will give all users.

The NBN Company will not be selling direct to us at all. It will be selling to our service providers.

They, in turn, will sell to us. The NBN Co. is only a wholesaler; it is the service companies who are the retailers. With the enormous number of companies involved as servers, it is expected that there will be bargains for those who go seeking them.

How you are connected to the system will depend on several factors. Where there is a solid cable coming into the house, there will be a fibre supply for the network to a node (look for a green box somewhere near you) where the connection between the fibre optic cable and the copper that is going



into your house will be made. Where there is not a good copper supply into your house, you will be connected by a fibre optic cable.

Where neither of these options is available, the connection will be via microwave from a central point and where that is not practical connection via satellite will be made. The promise is that everyone will be able to connect to the fast, reliable NBN system through your local server.

If you opt not to change to the new system, in about 18 months you could find you are disconnected altogether, as the Telstra and Optus copper systems will be closed down.

The talk gave us all much food for thought.

### John Moyle Field Day

There were ten AHARS members, including five ALARA members, at Womberoo, near Swan Reach, this year: all except three actually operated the radios. Propagation was not as good as it has been previously, there was even noise on 40 m. The suspicion is that some local houses now have solar panels



*Photo 3: Kevin VK5AKZ and Robert VK5ZHW operating on 20 metres sitting at their leisure in a shed. They were using a 20 metre dipole raised about six metres in the air.*

and the associated electronics which have made the difference.

It was great to have Patrick VK5MPJ there. He is one of our younger members and a very keen operator. He has participated in a contest, previously and thoroughly enjoyed this weekend as well. The other participants were Robert

VK5ZHW and Tina VK5TMC, our hosts, with John VK5EMI and his XYL Deidre, Kevin VK5AKZ and Jenny VK5FJAY, Keith VK5OQ and Jeanne VK5JQ and Christine VK5CTY.

We operate as a 24-hour, multi-operator station but can only use HF because of the remoteness of the property. There are simply no VHF amateurs in the vicinity except those actually staying there. The property is on the river side of the Mount Lofty Ranges.

No kangaroos were spotted this time but some of us saw an echidna. There are always many different birds to see and hear.

### The Lighthouse Weekend

This year, again, a group will go over to Kangaroo Island to activate the Cape Willoughby Lighthouse. Last year was very successful and hopefully this year will be as good.

If you have not already signed up for this but would like to, please contact Paul VK5PAS or David VK5KC.

### The next AHARS meeting

This is the usual Members only Buy and Sell, which is always a good night. Some exchange of goodies and much good conversation.

73

Christine VK5CTY



*Photo 2: The AHARS group except for the photographer, Kevin VK5AKZ. Jenny VK5FJAY, Deidre, John VK5EMI, Keith VK5OQ, Jeanne VK5JQ Robert VK5ZWH and Patrick VK5MPJ and sitting, Tina VK5TMC and Christine VK5CTY. The crew are more interested the activities of the dog than they are about having their photos taken.*



# VK4news BARG

Les Neilson VK4FAEB

BARC has had a great start to this year with plenty of new interesting overseas guests visiting our club and new members joining our ranks too. We are gearing up to meet the challenges before us with enthusiasm and relish.

## Project Saturdays

These days are proving to be a great help for members to bring and discuss their personal projects with other members. We have more time (around 4 hours) to socialise and work on any other club activities as well.

Note: Gary VK4FGZA likes to put on an impromptu BBQ and food for attending members.

## Licence training

Calling all amateurs; BARC has embarked on Foundation and Standard licence training for 2016 and we have purchased some resources to assist members in furthering their amateur ambitions.

And to gain an understanding of everyone's abilities and knowledge, we held practice exams at our Project Saturdays held at Rochedale Scout Hall which were based on the WIA syllabuses for Foundation and Advanced licences.

This helped us to ascertain where the main training focus should be and also for members to familiarise themselves with taking exams and to know how just much

they do and don't know in an exam situation.

Jan VK4EBP then configured a training program that covers all the necessary topics for each student. This formed some specific homework and given to each member based on the outcome of their exams to ensure that any gaps in knowledge can be addressed and everyone can successfully pass the exam with more confidence than studying alone.

## BARC 2 m repeater

I know a lot of members are excited to use the repeater which is a YAESU DR-1X 144/430 MHz dual-band C4FM/FM digital repeater.



## BARCFEST 4TH JUNE 2016

The Brisbane Amateur Radio Club Proudly Presents BARCFEST

<http://www.qsl.net/vk4ba/barcfest/>

Located at the Mt Gravatt Showgrounds inside the Community Centre – Parking is available on site Close to the hall.

Come on down and find yourself a bargain enjoy some great food, meet some new and old friends and maybe learn something new.

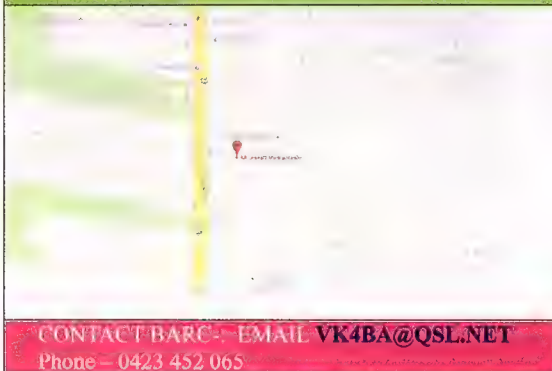
Doors are open at 9.30 and will close at 3pm - Entry Fee of \$7 includes a raffle ticket

Plenty of bargains will be on offer so pick yourself up a bargain or 12

VK4 ICE will have new gear available

Refreshments include Bacon and Egg burgers Hot dogs Sandwiches Cakes. Drinks include Tea/Coffee & Cold cans

Book a stall for yourself or club – only \$10 @ table



CONTACT BARC - EMAIL [VK4BA@QSL.NET](mailto:VK4BA@QSL.NET)  
Phone - 0423 452 065



It has been operational since late March in a low power mode, but progress is moving ahead with further refinements to the performance of the cavities, which when finished will allow us to move to full power and further range.

We have a regular 2 m Net to test out the functionalities among our members and to ascertain who can trigger the repeater successfully.

The repeater has a temporary home with Kevin VK4WA to bed it in and resolve any tuning up and operational issues. Once the Club tower is completed and operational, the 2 m repeater will be permanently housed with the 70 cm repeater inside the new BARC Hut.

### BARC Hut Progress

The main power has been laid and connected to the sub board with an

extra line to our lower store room for power and lighting.

Tower base construction is under way and is our next prominent project for 2016 to finish and then fit out the hut with all the repeater gear and training facilities ready in plenty of time to use for JOTA 2016.

Note: We are looking for a small Water Tank to attach to the hut. If any members know of a small water tank that can be donated or at low cost, please let us know as we would like to have it attached to the down pipes for a separate water supply.

### 2016 BARC Fest on 4th June

We have booked the Mt Gravatt Showgrounds for 4 June 2016. We are in the Upper Community Hall and have the run of the outside area as well with plenty of parking available.

A BARC flyer has been sent to retailers and clubs advertising the date and time so that plenty of bargains will be on offer for all of our visitors.

We plan to do all the catering ourselves to maximize the profits available for the club and planning to serve Hot Tea and Coffee, sandwiches, cakes, cold cans of drink, Bacon and Egg Burgers, fried onions and hot dogs cooked fresh while you wait. Are you getting hungry yet, because we are looking forward to hosting a great event.

Thanks

Have a great Day

Les Neilson

Rosedale Sth Qld

Ham VK4FAEB

BARC President

## GippsTech 2016

Those wishing to present at this year's conference should contact the Chair as soon as possible:

**[vk3pf@wia.org.au](mailto:vk3pf@wia.org.au)**

Peter VK3PF

Conference Chair

The annual GippsTech conference is coming. GippsTech has a reputation as a premier amateur radio technical conference. It focusses primarily on techniques applicable in the VHF, UHF and microwave bands, especially for weak-signal contacts.

**GippsTech 2016** will be happening on the weekend of the 9th and 10th of July, at Federation University Australia Gippsland Campus in Churchill, Victoria, about 170 km east of Melbourne.

### Call for papers

Anyone wishing to share information with others is invited to submit a title and brief summary of your planned presentation to the Conference Chair Peter VK3PF as soon as possible.

Please be sure to indicate your expected length of presentation: it could be a short 10 minute item through to a detailed presentation of up to an hour.

We look forward to seeing you at GippsTech in early July.



Further details will be available from the Eastern Zone Amateur Radio Club website: <http://www.vk3bez.org/>





## DXTalk

Luke Steele VK3HJ

Some of the most rare and interesting DX has been active over the past several months. Most notably on air have been six of the Top Ten Most Wanted entities.

In December 2015, Dom operating as **P5/3Z9DX** gave a demonstration of amateur radio to the authorities in Pyongyang. Dom made several hundred contacts on 15 m and 10 m, including a number of VK DXers. Ranked No 1 Most Wanted, this was a rare opportunity indeed.

**Palmyra Atoll (K5P)**, ranked 9<sup>th</sup> Most Wanted, was on air in January. This one was a nice easy DX to work here, being located mid-Pacific, south of Hawaii. For much of the rest of the world, on a declining Solar Cycle, it was a tough one to work, especially from Europe. This time, we were the winners. K5P made over 75,000 contacts.

Next, in February 2016 was the Intrepid DXpedition to sub-Antarctic islands **South Sandwich (VP8STI)** and **South Georgia (VP8SGI)**, ranked 3<sup>rd</sup> and 8<sup>th</sup> Most Wanted. Plagued by bad weather, the team had to abandon the camp at times, to shelter aboard the "RV Braveheart". These two were particularly difficult to work from most of VK as it was a polar path, straight over the South Pole.

In late March into April, on air was **Heard Island (VK0EK)**, for the first time since 1997 and ranked 5<sup>th</sup> Most Wanted. This one was quite workable on most bands from VK, although later in the expedition, poor propagation conditions made it difficult for much of the world. In fact, the solar flux index had not

been so low since the other side of the peak, in November 2010. To make things worse, there was quite a lot of geomagnetic activity, making HF propagation even more difficult. Heard Island is sub-Antarctic, and at times was experiencing visible aurora. Nonetheless, they made over 75,000 contacts in the 20 days they were on air. Visit their most informative website for a day by day account with pictures: <https://vk0ek.org/>

Also in March into April was **Juan de Nova (FT4JA)**, ranked 6<sup>th</sup> Most Wanted. Juan de Nova is a tiny island in the Mozambique Channel, between Madagascar and Mozambique. Some careful band planning coordination was negotiated between this and the Heard Island DXpedition to avoid conflict between the two, and the DXers chasing them. Compared with the freezing conditions of Heard Island, the team on Juan de Nova Island had to endure high temperatures, well into the 40s, but they enjoyed better propagation, being much further north. FT4JA finished with over 105,000 contacts in the log, and was quite workable on many bands from VK. The DXpedition operators also gave VK DXers a chance to work them.

After these activations of Top Ten Most Wanted entities, the Top Ten list will change considerably. It will take a month or two before Club Log has an updated list, as this is calculated on confirmed contacts uploaded. Other news on the DXCC list is that as of 29<sup>th</sup> March 2016, **Kingman Reef** (was 7<sup>th</sup> Most Wanted) is now a Deleted Entity, as the administration of the reef

has changed, and it is now mostly underwater. The DXCC List now includes 339 entities, and Honour Roll may now be achieved with 330 entities confirmed.

Together with the Top Ten feast, there has plenty of choice DX for us to enjoy.

In late October 2015, in the park beside the United Nations Headquarters in New York City, a group set up to celebrate the 70<sup>th</sup> anniversary of the United Nations. This was a limited operation, only allowed during daylight hours of the 24<sup>th</sup> and 25<sup>th</sup>. No amateur radio activity has been allowed from this "entity" in several years, due to renovations in the UN HQ building where there had been an Amateur Radio Club station on the floor above the Secretary General's office.

**Chesterfield Island** was on air in October 2015 as TX3X and was fairly easy DX for us to enjoy, as was **Willis Island VK9WA** the following month.

In late November 2015, **SV2ASP/A**, Mt Athos appeared on 15 m CW one evening, calling Asia. For the first time in years, he was heard in VK and several stations here did work him. Normally it is only Monk Apollo, of the Docheiariou Monastery, who operates from this DXCC entity. He comes on air only several times each year, so to hear him is a rare event indeed.

In January 2016, Nicolas F4EGX was active from Kerguelen Island as FT5X, but apparently only a few from VK managed to work him. Nicolas was there studying penguins on the sub-Antarctic island.



Also in January, IOTA DXpedition ZL9A was active from Antipodes Island (OC-286). Formerly known as Auckland and Campbell Islands, this group is now known as New Zealand Sub-Antarctic Islands.

In February, Guinea in West Africa was activated by the Italian DX Team. Unlike some other DXpeditions in Africa, the IDXT does make an effort to look for VK and ZL DXers.

One of the "other" Guinea's, Equatorial Guinea was activated in March. Ken LA7GIA operated from the capital city Malabo, on Bioko Island. Ken also made a significant effort to log VK stations.

This has just been a short review of the more interesting DX activations. In addition to the above, there has been no shortage of DX activations from all over the world.

### Upcoming DXpeditions

**8-15 May. E44QX** will be active from Jericho in Palestine. The three German operators will be active 80-10 m, mainly CW, with some RTTY and SSB. They will be using a Spiderbeam and verticals, with two stations. QSL via LotW, or via DF8DX.

**12-22 May. J68GU**, St Lucia. Gerd DL7VOG will be returning to the Caribbean, operating CW and

RTTY on HF bands. Gerd is always happy to work VK stations too. QSL via Club Log.

**20-31 May. VK9NT, Norfolk Island.** A group of VK operators will be activating Norfolk Island again, this time to coincide with the WIA Annual Conference. They will be operating 160-10 m, with dipoles for HF, and an inverted L for 160 m. QSL via LotW, or via VK2CA. Also on the island for the Annual Conference will be a number of other VK operators, many of whom many will be planning some time on air.

In next month's DX News, we will review Solar Cycle 24.

73 es good DX, Luke VK3HJ.

**VK6ANC**

## Northern Corridor Radio Group 2016 Hamfest Sunday 7 August 2016

**VK6NC**

The Northern Corridor Radio Group is holding the annual 'Hamfest' on **Sunday 7 August 2016**. Come along and enjoy the Hamfest and demonstrate your equipment or sell whatever amateur radio gear you may have as surplus.

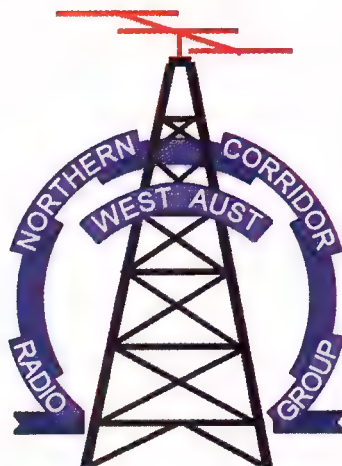
We are planning on some changes this year so come along and see. Last year there were nearly 60 tables taken so please let us know if you would like one allocated. There is no charge for the table, just an entrance fee of only \$5 for every person – NCRG - members included. Once again we are staging our mega raffle with some great prizes. The location of Hamfest is the Cyril Jackson Community Hall in Fisher St Ashfield 6054, 8 km from the City Centre, in a large air conditioned hall with ample space for several hundred people and supplier stands.

Don't forget the Homebrew Competition, or our tasty food. Hamfest starts at 9:00 am and the finish is around 1:00 pm. Suppliers can set up from 7:30 am.

WA's largest Amateur radio event is not to be missed !!

To book a table you can:

- visit our web page for additional information [www.ncrg.org.au](http://www.ncrg.org.au)
- email us at [hamfest@ncrg.info](mailto:hamfest@ncrg.info)
- contact Keith Bainbridge VK6RK on 0488 228 088



*Affiliated with the WIA*

Po Box 244  
North Beach  
WA 6920

**VI9ANZAC**

active on Norfolk Island for the WIA AGM & associated activities:

Your **only chance** for this special callsign! Valid for the *Norfolk Island Award*.

Also try to work VK9WI and VK9WIA, plus others active on Norfolk Island for the WIA activities.



# Silent Key

Raymond (Ray) Charles Rutledge VK3ZQ

The following draws heavily on material in the eulogy delivered by Bruce Bathols VK3UV.

Ray met his wife Wilma in 1948 at a church social function and they were married on 18th October 1952 at the Congregational Church in Grange Road, Glenhuntly. They had three children Colin, Neil and his daughter Faye. There are two grandchildren - Stephen and Cristie, and three great grandchildren - Madison, Juliet and Hanna.

He was born in Deepdene and raised in Glenhuntly, where he attended Glenhuntly Primary School, then completed his secondary education at Caulfield Technical School.

Ray did not gain any major tertiary qualification, but did attend some night school classes in the earlier years. He obtained his electronics knowledge from Caulfield Tech, his home based hobby interests and experience on the job. In those days it was not necessary to have formal qualifications, just an ability to do the job properly and efficiently.

Those who knew Ray were aware of his strong theoretical knowledge befitting of any professional engineer. Ray obtained his amateur radio licence in the mid-forties when he was a teenager, and was allocated the call sign VK3ZQ which he held right up to the day he passed away.

After leaving school, Ray went to work at Veall's Electrical in 1945, where he worked in the workshop and did repairs on some of the electronic equipment.

In 1946 he went to Radio Corporation, and remained there until 1950, when he moved to Australian Sound until 1955. He next worked at Tele Sonics for 12 months, then in early 1956 went back to Radio Corporation with the advent of television. Radio Corp was rebadged as Astor and their 17 inch TV sets were very popular. Ray's interest and focus was for many years in Television, and he stayed with Astor (who were acquired by Phillips) until he retired on 31st October 1987.

Upon marriage, he and Wilma moved to Highett in 1952, where they stayed until



they moved to the retirement centre in Sandringham in 2013.

Ray was good at problem solving and making things work. In 1975 he was sent to Singapore by Philips for a short time. He was fastidious about sound and quality. He designed, built and learned to play a fine electronic organ.

Ray's main interest was in electronics, and although deeply involved in the technical facets he was always a very dedicated family man.

When Ray retired, he and Wilma went on several overseas trips. Their first trip was to Switzerland, and then they visited Europe, England, Scotland and Canada over the next few years. Wilma did all the organizing for these journeys. Ray was more than happy for his wife to deal with these things. He

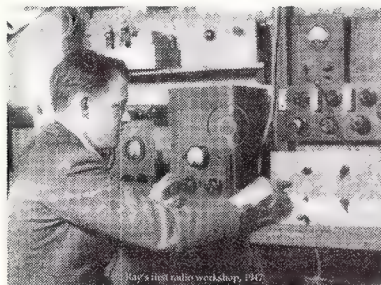


Photo 2: Ray's first radio workshop 1947.

used to say he was good at earning and she was good at managing.

Ray encouraged others to become amateur radio operators and one of these was Bruce Bathols VK3UV who presided over the celebration of Ray's life.

Ray established a well-appointed amateur radio station at the family home in Highett, and was a long respected member of the Moorabbin and District Radio Club. He was involved in the running of the Club for a time. At times he could seem impatient and when others were rambling at a meeting, his favourite saying was "Moving on...".

Ray's interests included photography and his photos of the last lunar eclipse were shown at MDRC. Prior to that he frequently made videos of guest speakers at our meetings. He attended almost every activity the Club mounted. After his retirement he was a regular attendee of the Tuesday mornings coffee group.

Although his transceivers were factory built, Ray continued to build equipment, mainly test-equipment such as a Q meter and dip oscillator and an rf bridge.

During the past two years, after they had moved into the Retirement Centre, Ray had to dispose of most of his radio equipment. With the help of Ian VK3IX he set up a 2 m station at the centre which meant he wasn't completely off the air.

By the middle of 2015 Ray was not able to get around too much without the assistance of a mobility scooter. He went everywhere on it, and even visited one of his radio mates in Brighton. He was also keen to travel to the Moorabbin Radio Club on it, but his health had deteriorated so much that he was not able to do so. Ray's friends noticed him mellowing in his last years as the result of a number of strokes but at times we had glimpses of his sharp and enquiring mind. He was a significant part of Australia's radio and TV manufacturing industry and some of that history has now gone.

However it is the man himself who is missed by his friends.

Compiled by Ron Cook VK3AFW for MDRC.

## Help us

Contribute to the **Weekly WIA News Broadcast**. See our website for details.

[www.wia.org.au/members/broadcast/contribute/](http://www.wia.org.au/members/broadcast/contribute/)





# CW Today

Louis Szondy VK5EEE

e vk5eee@wia.org.au

In the March issue of *Amateur Radio*, containing the 5th edition of *CW Today*, we introduced the feedback of many CW operators to this author which have voiced concerns regarding a number of issues which at times cause friction in the sharing of spectrum between different aspects of the hobby. Further feedback was sought regarding conditions which generate friction, interference and/or inability to pursue the hobby as per our various expectations. An overall lament has been the declining standards and lack of consideration for others in our limited shared resource with several recurring themes of complaint, which we will address in this issue of *CW Today*.

## Changing landscape

Sometimes the easiest way to notice changes is to be away for a long time and not experience the slow and gradual changes that may otherwise go largely unnoticed. An analogy is the frog when thrown into boiling water, will jump straight back out, perhaps unscathed. However if left in lukewarm water and the temperature slowly rises, the frog doesn't notice the gradual change and adapts to it, until it is so warm that he loses energy and falls asleep and is then finally boiled alive, unable to save itself if it realises something is wrong.

Having been out of Australia for over 30 years, the experience of returning here was like that of a frog thrown into boiling water. The over-regulation, dehumanising check boxes and the attempt to make a perfect system out of everything, when humans are far from perfect, and the general unawareness of the population of how much freedom has

been taken away from them, were only too obvious to me. That doesn't mean there aren't many others aware of these issues, just as in amateur radio, we all know something is wrong, and many can put their finger on it.

When I was last active on amateur radio some 20-30 years ago, the CW bands had very different activities and sounds compared to now. Local noise levels were much lower, many CW signals had interesting chirps, buzzes and clicks, and there was more consistent activity. The bands were not nearly as quiet as they are now out of contest times and DX activations, and on weekends and during DX activations and contests they were not nearly as busy. In other words, there was far less imbalance, and there still was pretty much room for everyone most of the time.

National society band plans were often more detailed and largely adhered to, with few pointing out their legal right to transmit SSB in the CW section or use USB on 40 m or LSB on 20 m. Contests generally avoided the lowest part of the bands, traditionally reserved for long distance intercontinental QSOs, as well as the higher ends of the CW bands reserved for low power QRP, non-contest and slow speed QRS activities. The rubber stamp QSO generally was the norm and included an honest RST report, QTH, name and details of rig, power, antenna and greetings.

## WARC bands

When the WARC bands were introduced, it was fortuitous timing, because contests had become larger and more widespread resulting in increased friction with non-contesters who lamented the increasing spread and QRM. In those days many contest stations had key clicks

tens of kHz wide, and were running obviously way too much power, as they often still do, though now thankfully signals are much cleaner and narrow. It was at this time that WARC bands became available, hard won after a great many years of effort to convince other services and government of the need to give amateur radio, under pressure of frequency spectrum especially between 7 and 28 MHz, additional frequency bands at 10.1, 18.068 and 24.89 MHz (30, 17 and 12 m).

This eased off the pressure on 40 and 20 m in particular during contest times, as many could now use 10 or 18 MHz to conduct those normal rubber stamp or "rag chew" chat QSOs. Because of the narrow bandwidth of the WARC bands, national societies wisely passed resolutions via IARU that determined that some modes and types of operation were not to be allowed on the new bands. Contests, due to their large spread and growing popularity, were not allowed on the WARC bands. The 30 m band however, had and still has, additional restrictions, as a special case.

## 30 m Band - a special case

The difference between 30 m and the other WARC bands, is that amateur radio is still a *Secondary Service* on 30 m, whereas on 17 and 12 m we are in most countries the *Primary Service*. At 30 m we do not have a shared status with other non-amateur radio services: the *Primary* users, the *Fixed Service* have absolute right to cause us QRM while conversely we must completely avoid any QRM to non-amateur fixed service signals, no matter what mode they use, on the 30 m band. Because of this, the IARU had additional restrictions advised for amateur radio stations on 30 m: no automatically controlled unattended stations (unattended WSPR is not supposed to be on 30



m, for example, and Norway's NARL has raised this issue as a major concern), SSB was also restricted other than in Sub-Saharan Africa (WIA also gave Australia an SSB shared band), and broadcasts and beacons (with the exception of DK0WCY Aurora Beacon) are also discouraged from 30 m.

However, DX activations were not restricted and back in those days did not present the problem they do today. Many CW operators are now complaining about the narrow 15 kHz (in Australia) or around 30 kHz elsewhere, being completely taken up by even single DX activations with pile ups spread as wide as 35 kHz on several major recent DX expeditions. 20 years ago, and perhaps until more recently, it was usual for rare or popular stations to operate split as "UP 1". Now the common default is almost always simply "UP" or "DN" meaning stations are encouraged to call on any legal frequency above or below the DX station, resulting in these unrestricted pile ups.

**An obvious requirement in abiding by the terms of our licenses when operating on 30 m in particular, is to listen on our transmit frequency at all times in order to be able to hear if any station which may not be an amateur radio station issues a "QRT" command or "QSY" to cease transmission or change frequency.** When operating split, this is no longer possible for most stations, if the split is greater than the audio pass band of the filter which is usually a maximum of around 2.3 kHz or so. Hence, it appears logical that split operation should not be occurring on 30 m, and if it does, not greater than 2 kHz to allow callers to remain within the terms of their licences.

### 30 m simplex experiment

In the light of feedback and complaints from many CW operators regarding the DX split operations especially on 30 m, I decided to update myself with the current situation and conduct some experiments and analysis.

The results were interesting. In one, it was observed that even if I called CQ off frequency from a DX activation, several stations immediately broke the terms of their licences by acting as cops and telling me to QSY, without identifying themselves. This even though in CW, a separation of 500 Hz is already considered more than adequate spacing especially on a narrow band. Even 2 kHz from the DX, I was being subjected to DQRM, and even when I tuned 5 kHz and more away, DQRM followed me to each frequency I'd first checked with "QRL?".

The second experiment was to call the DX station who announced they are listening down "DN" by calling 500 Hz down. This too, although it also complied with my licence condition in that I could listen to both the DX frequency as well as my own within the audio pass band of my filter, resulted in "pirates" (amateurs failing to identify) acting as frequency cops, and abusive words.

A third experiment on a different day, which lasted 20 minutes, was to use the old fashioned way of calling DX on their frequency, but using full QSK (full break-in) and only calling when the DX station's signal was clearly audible, not suffering from interference, noise or excessive fading, basically Readability 5. In this manner I called VK0EK without ever causing any interference as I only called when the DX was listening. As soon as the DX responded or made any transmission, I ceased without a further dit. Being able to send above 40 WPM, my reflexes are fast and this was very easy for me. The results: in this 20 minute period I did not cause any amount of QRM to VK0EK whatsoever, but a total of 30 incidents of DQRM occurred, not while I was transmitting, but generally when VK0EK was transmitting, as the self-styled cops decided to hurl insults, with only 2 of the cops identifying themselves.

No contact resulted here, as VK0EK on its web site made it clear it will not be accepting any simplex calls, and in calling was announcing

"DN" to indicate they were listening down. A fourth experiment, already conducted prior with the same success with K5P, was to call with a reasonable split (900 Hz) when signals were at least S7, and when calls were being answered at this split offset, with success on the first try. In the next issue of CW Today we will look at time tested and proven ways of getting results fast in calling DX in pile ups: what is meant by the constant DX mantra of "listen, listen, listen" and how you can then give a single or at most two or three calls and be successful instead of sending your call sign over and over for hours on end.

### Real actual DQRM

An interesting fact resulting from these experiments in revealing some of the problems of DX operations, is that although I did not cause a single incident of QRM to VK0EK, the 30 DQRM incidents during those 20 minutes were by unidentified stations bar two, yet the DQRM were not the subject and target of campaigns, I was. The same thing can be heard in most of the activations whereby deliberate QRM is being caused to DX operations by unidentified stations that cause QRM in telling others what to do. The results of these experiments can be shared with VK0EK CW operators after the operation is over, including a very detailed analysis of the simplex calling experiment and its outcomes. VK0EK have introduced many novel techniques perhaps never before used in major DX expeditions such as listening down instead of up, and almost live sharing of results and data online. They may possibly have already taken on board some of the criticism of the QRM caused by their pile-ups and 30 m split, though this remains to be seen.

Already many CW operators have been increasingly vocal in growing tired of what they perceive as inconsiderate operations of DX expeditions funded by big money and their lack of ability to control their pile ups in general, and resent their treatment of the hundreds



of disrupted DX QSO by others as "collateral damage". However, although much of the blame is to be laid at the feet of the DX expedition organisers and operators for not operating with due responsibility and consideration on the only 50 kHz-wide 30 m band, and even with excessive unlimited split operations on other narrow or popular bands such as 17, 20 and 40 m, there is another problem which may explain the inability or unwillingness of DX expeditions to look at the root of the problem and demand some solutions to its negative impact or otherwise their inability to control it: computer technology.

### Computer technology

Thanks to computer technology, it is now possible for CW to be decoded, albeit unreliably and probably without full QSK. Thus all of a sudden anyone with a computer and a decoder is assumed to be a "CW operator", or, more accurately, a "DCW user" (Digital CW). Pressing of macro buttons, and inability to cease transmitting as soon as the DX transmits, is also all too obvious an occurrence when analysing the pile ups: callers don't cease calling when DX transmits, they transmit thus on top of the station being called, the DX has to call again. Moreover, all too often DX has to send a callsign and report three or more times, because the DCW user doesn't have reliable copy on the DX. It is very hard to get reliable copy with DCW in real HF conditions.

The other side of the big DX pile up problem is the Internet. Due to many amateurs using the Internet

to report "spotting" of DX as soon as they are heard, a pile up appears out of nowhere. Gone are the days of chasing DX by tuning around, and the wrong assumption made by many of the Internet hams is that as soon as a DX station has used a particular frequency, and was spotted in another part of the world while propagation doesn't exist in this part of the world, that frequency is to be kept clear 24/7 and cannot be used by others. DX clusters thus deserve a special mention as to their effects and short-comings.

### The DX Cluster problem






DX spotting on clusters has resulted in DX expeditions initially being hampered by almost instantaneous pile-ups as a result of Internet alerts notifying chasers of the DX often within seconds of them becoming active on a frequency. To make matters worse many callers are even operating remote stations via the Internet (with resulting time lag) from their work places, thus are generally also using the woefully inadequate DCW mentioned above. However, rather than attempting to mitigate the problem by, for example, demanding that reputable clusters have an option for any call sign to be removed just as one has the right to be on a "no call" telephone list, DX clusters have embraced clusters as a means of getting ever bigger piles ups with ever higher numbers of stations calling them. Perhaps the boast is now on as to which DX can create the largest pile up, and work the most stations within 24 hours. However, in spite of the problems mentioned regarding DCW and the

Internet, DX stations have resorted to a simple but unsatisfactory work-around: unrestricted pile up widths, so that they can tune and pick more easily out of the pile up.

Yet these DX clusters have additional problems as a screen shot of one supplied by a reader and published here, reveals. They do not require any verification of identity or authenticity for anyone to register and post spots, along with comments, using fake call signs, insulting and hurling abuse and foul language at others. Renowned DXer OT Jean, 5T0JL, aged 88, when calling CQ, refuses to violate the regulations by operating split and not listening on his frequency, so as to avoid causing QRM to others. He thus takes calls on his own frequency. He too is a frequent victim of aggressive language on clusters demanding that he operate split, and restrict his QSOs to "5NN" instead of – as he enjoys it – the exchange of an honest report and at very least, names in order to merit his QSL.

CW operators are now waking up to the reason why they are sometimes suddenly being called by a small pile-up: they were "spotted" on an Internet DX cluster. Moreover many of those callers simply come up with their call sign without even sending the callsign of the station they are calling, and expect only a "5NN". Many too are again DCW users, and thus will make for a difficult QSO at the best of times. Many of us wish to call CQ and have people find us by tuning around, without the use of computers. There ought to be a way to opt out of clusters and spotting.

Photo 1: Some of the DX Cluster traffic during my experiments.

DX de	Freq	DX	Flags	Comments	LTC	Date
VK2HV	14 034,0	 VK5EEE		why DQRM ????	09:39	25/03/16
VK2HV	10 119,1	 VK5EEE		you are a sick FW	07:51	24/03/16
VK5EEE	101 190,0	 VK5EEE		Yes I DQRM VK0EK - I am idiot	07:50	24/03/16
VK2HV	10 119,0	 VK5EEE		cq on top WHY	07:44	24/03/16
VK3JEF	10 119,5	 VK5EEE		your a dickhead	07:43	24/03/16



<del>VK0EK</del>	10116.0	24 Mar 23:47	<del>KC3X</del>	sick sad operators on his freq
<del>N2MO</del>	10138.0	24 Mar 23:45	<del>N6DBF</del>	JT65, -17 in soca1
<del>VK0EK</del>	10116.1	24 Mar 23:45	<del>KN4KL</del>	
<del>VK0EK</del>	10116.0	24 Mar 23:44	<del>EG4NO</del>	No sig on 30 and 40M
<del>Z4LE</del>	10120.0	24 Mar 23:43	<del>N3LPL</del>	Heard in NC and NH
<del>N4RFP</del>	10138.0	24 Mar 23:41	<del>N6DBF</del>	JT65, -08 in soca1
<del>VK0EK</del>	10116.0	24 Mar 23:40	<del>LUGOJ</del>	wkd 2 dwn Tnx
<del>VK0EK</del>	10116.0	24 Mar 23:39	<del>VK0EK</del>	QOS should be here soon!careful
<del>VK0EK</del>	10116.2	24 Mar 23:38	<del>KT1G</del>	QSX 10113.6
<del>N2RL</del>	10116.0	24 Mar 23:36	<del>VK2HV</del>	also vk0 limit is 400 watts :-)
<del>VK0EK</del>	10116.0	24 Mar 23:34	<del>N3PL</del>	It is a 200 watt limit on 30
<del>N2FGW</del>	10138.0	24 Mar 23:32	<del>N6DBF</del>	JT65, -18 in soca1
<del>VK0EK</del>	10115.0	24 Mar 23:28	<del>WB2REN</del>	My amp going
<del>N2RHU</del>	10112.0	24 Mar 23:26	<del>DL4HG</del>	nr.Detroit nw cqing
<del>VK0EK</del>	10100.0	24 Mar 23:25	<del>N2MYA</del>	No Amps On 30 M Lets Follow The Rules!!
<del>VK0EK</del>	10100.0	24 Mar 23:25	<del>VK0EK</del>	scumbags qro on 30m&60m
<del>VK0EK</del>	10116.0	24 Mar 23:24	<del>K4EA</del>	More amps going
<del>G2LBN</del>	10138.0	24 Mar 23:23	<del>N6DBF</del>	JT65, -20 in soca1
<del>VK0EK</del>	10100.0	24 Mar 23:18	<del>VK0EK</del>	assholes tune amps on 30m?
<del>N2ZN</del>	10114.5	24 Mar 23:18	<del>KB3OZC</del>	thank you!
<del>VK0EK</del>	10116.0	24 Mar 23:16	<del>N2ZN</del>	y tune on tx freq go +1 & tun
<del>VK0EK</del>	10116.1	24 Mar 23:13	<del>N4BBH</del>	
<del>N2JGR</del>	10138.0	24 Mar 23:08	<del>N6DBF</del>	JT65, -19 in soca1
<del>VK0EK</del>	10116.0	24 Mar 23:06	<del>K3MA</del>	IF you got it use it
<del>VK0EK</del>	10116.0	24 Mar 23:04	<del>N4JDX</del>	TU TU use <a href="http://www.dxa3.org/">http://www.dxa3.org/</a>
<del>VK0EK</del>	10116.0	24 Mar 23:04	<del>NQ7R</del>	Sounds like a few kws on
<del>VK0EK</del>	10116.0	24 Mar 22:54	<del>NK0SAJ</del>	TZ4AM is 10115.0 listing up on his freq
<del>VK0EK</del>	10116.0	24 Mar 22:54	<del>N4JDX</del>	QSS DOWN it is a DEXPEDITION

Photo 2: DX Clusters: insults, abuse and faked callsigns.

## Problem resolution

Clearly these issues and the friction they cause, as well as the extensive interference caused by unrestricted pile-up spreads and multiple contests occurring concurrently, need addressing. It appears that most of us myself included have no objection to DX activations and contests per se, and see them as useful activations of amateur radio frequencies. However, unfortunately these activities are now clearly impacting upon large numbers of traditional radio amateurs who, even though they may have professions in the ICT fields, choose to have QSO in relaxed longer-form style and without the aid of computers or Internet, and are seeing their own enjoyment of the hobby being pushed away by special interests such as DX activations and contests.

So that all aspects of the hobby can return to the days when they managed to share the spectrum with less friction, some guidance is required, and options and solutions

should be sought. Clearly risking the loss of 30 m at a future WARC because primary users may point to the QRM they have experienced, or as a reason not to grant additional allocations at 8.5 and 12.5 MHz for example, should also be minimised. The IARU should step in to restrict split frequency operations on 30 m at the very least, and issue guidelines on other bands, perhaps designating certain sub bands for remote DX stations and others for their split QSX. The WIA could start this process via consultation with various parties, and put forward their suggestions at regional conferences.

Otherwise it appears that traditional CW operators may have to cede the traditional CW bands, and migrate to quieter pastures, as a work-around. The matter is being made worse by the ARRL recent band plan giving away the formerly exclusive CW bands to be shared with RTTY and data modes and the WIA recent submission to ACMA. This of course is bad news for the

future, if not corrected, because digital modes cause immense QRM to CW, but CW only minimal QRM to Digital modes. Likewise, SSB is more of a QRM to CW due to its wide band width. CW is allowed throughout the bands, and when the CW band is too crowded or QRM too severe, the only current option is to find clear frequencies within the SSB top portions.

## Future of amateur radio

In the April edition of *Amateur Radio* I counted no less than six Silent Keys. Aside from the fact that the majority of radio amateurs have never had a key and thus always were silent keys to begin with, the loss of life of one of our number whether CW operator or not, signals a further decline to the hobby and a loss of knowledge, experience and on-air activity, for us all. Thus the replenishing of our ranks into the future is essential for safe guarding our rights and privileges, since although amateur radio is at the root of most technological benefits of modern society today, we have not even managed to have the ITU put our traditional HF bands at our disposal in perpetuity and should be lobbying to do so, as advised by OT George VK2FF.

## Feedback

Further solutions and ideas on how to solve the problems that have been raised by readers, some of which have been presented above, are welcome, and can be addressed to the author. In the next issue of *CW Today*, we may also have a look at some at some methods to be successful in working pile ups, from the chaser side of things, as used by experienced and skilled CW DXers.

*Editor's note: The views presented are those of the author and those with whom he corresponds. This journal and the WIA do not necessarily endorse his views or actions on air.*



# VK3news Amateur Radio Victoria

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## The AGM this month

The WIA Victoria - Amateur Radio Victoria annual general meeting starts at 8 pm, on Tuesday 17 May, in the Ashburton office. All financial members would have had online access to the annual reports by the President Barry Robinson VK3PV and the Secretary/Treasurer Ross Pittard VK3CE.

Please have a look at this material which outlines the performance of the state-wide organisation. This will be explained further at the AGM, which also gives members an opportunity to ask questions of office-bearers and make suggestions or comments.

The AGM is a requirement under the Corporations Act, to conduct business including to receive and consider Annual Reports, the Auditor Report supplied by Barnard Baudinette & Co and a Profit and Loss Account for the year ended 31 December, 2015.

However it is also a social occasion and after the formalities members are invited to enjoy the refreshments served.

## Office equipment improvements

Major projects have occurred recently to the offices at Ashburton. In an effort that consumed most of the day, the telephone system, power, security and phone/internet access was beefed up. A new Telstra phone service was installed which bundles a VoIP phone and data package. The old fax service has been cancelled. The new package cost is \$90 per month which is a considerable reduction on the current average cost of \$245.

The working bee involved other projects including some new transmitters for the VK3BWI broadcast network.

Peter Mill VK3APO and Ross Pittard VK3CE were able to show the rest of Council when it met that evening that the planned changes had been achieved. Each change had to be tested to make sure it worked correctly, but the efforts of Peter and Ross have been worthwhile and most cost effective.

The meeting also heard that six nominations were received for

Council. These were from Barry VK3PV, Ross Pittard VK3CE, Peter Mill VK3APO, Jim Linton VK3PC, Tony Hambling VK3VTH and Peter Cossins VK3BFG.

Because these do not exceed the vacant positions on Council for the 2016-19 term, there was no need to conduct an election.

## Future radio amateur education

Enrolments are now open for the quality Foundation licence instruction classes and assessments on June 11-12.

These are at the Amateur Radio Victoria office 40g Victory Boulevard, Ashburton. The necessary study and operational practice guide book now in its 3<sup>rd</sup> edition, is on mail order from the Amateur Radio on-line shop.

To enrol or find out further details, please contact Barry Robinson VK3PV [foundation@amateurradio.com.au](mailto:foundation@amateurradio.com.au) or 0428 516 001.

## Over to you

### Spectrum space by divine right?

Dear Peter,  
In CW Today, Lou VK5EEE has described the changes which have slowly crept up on us very well, with a description of the marvellous way things were, and has advanced a few good suggestions which may restore civility and good order.

Designated "gentleman's agreement" frequencies for DXpeditions are well over due, together with designated and narrow listening bands. If "gentleman's agreements" don't work, then regulatory enforcement may be the answer.

This phenomenon of being locked out of large chunks of bands when DXpeditions are active, has to stop. Merely setting up stations in geographically remote or exotic locations should not confer spectrum ownership.

No station should be forced to give way to a DXpedition and/or its pile up if it has a prior and rightful occupation of any frequency under International Regulations.

I'm certain that users of SSB and other modes have also been forced to slog their way through DX pile up and Contest QRM suddenly

descending on them, contrary to ITU Regulations.

As regards the future of CW and amateur radio, personal computers and other digital communications devices are becoming very "old hat", and about as interesting and challenging as an STD Call. A lot of the communications traffic is banal and even toxic, sad to say.

Amateur radio, and particularly modes like CW, offers something different and challenging – at present – but good order and civility is being threatened.

Col Whale VK4CU.





## New **Foundation Manual** is available now

### Your Entry Into Amateur Radio



Your **Entry into Amateur Radio**, The Foundation Licence Manual 3rd Edition is **now available** for purchase.

As stocks of the 2nd edition were nearly depleted, the WIA formed a sub-committee to review, revise and publish the third edition of this very successful study aid.

The team, consisting of Robert Broomhead VK3DN, Jim Linton VK3PC, Peter Hartfield VK3PH and Ivan Smith (Communique Graphics), worked hard to revise the manual that has seen the amateur population grow since the introduction of the Foundation licence over ten years ago. Many thanks to those that have provided feedback on the second edition.

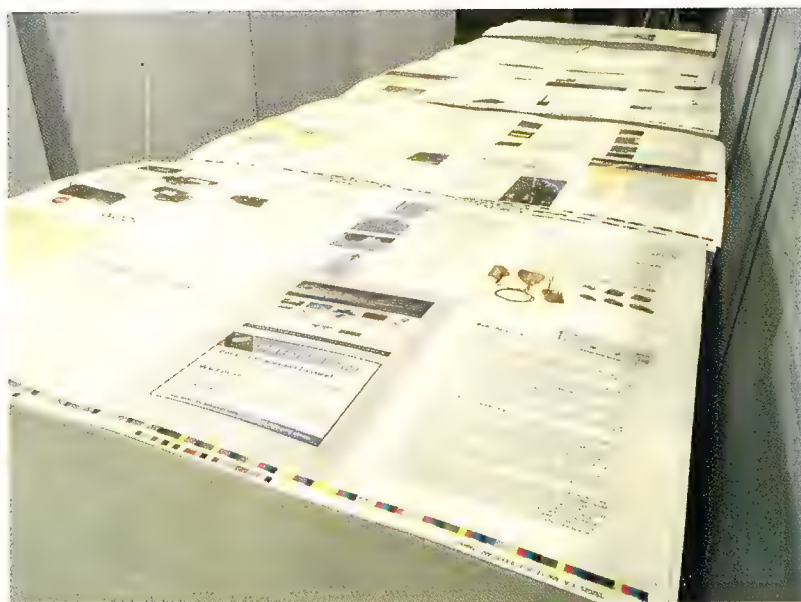
It has been the standard, must have, reference manual for entry into amateur radio in Australia.

The 3rd edition contains revised text, more images, the latest first aid resuscitation chart and a copy of the band plans that were released by the WIA at the end of 2015.

The Manual is attractively presented and contains all the information needed to qualify for the Foundation licence in Australia.

It includes the Foundation licence syllabus and other extracts reproduced with permission of the Australian Communications and Media Authority.

To purchase the Manual, order on-line at the WIA bookshop or obtain a copy through the learning facilitator at your local radio club.







# ALARA

Christine Taylor VK5CTY – Publicity Officer

## THE ALARA AGM

We are very pleased that we have always been able to say we have a large number of members on the air for our AGM. This year the AGM will be held on the third Monday of May – the 16<sup>th</sup>. Let's hope this one is as good.

Because it is the third Monday we will be using both 80 m (3.5700+/-) and EchoLink on the ALARA Conference station at 1030 UTC. Please join us that night so we can again say we had many participants. For more information and the list of nominees, see your April Newsletter.

## The regular Monday night nets

The EchoLink plus 80 m will continue to be used as the trial has been so successful.

The net is run only on EchoLink on the first Monday of the month. On the second and fourth (and fifth sometimes) Monday on 80 m and on the third Monday both HF and EchoLink are used.

As usual, during our winter, when we change the net time back by just half an hour, the noise level has been quite high on some nights but once we change to standard time propagation improves. In summer we operate from 1000 UTC, in winter we start at 1030 UTC. Hope to see you then.

## Hamfests and Field Days IN VK2 and VK3

As always, Dot is a regular face at the Wyong and Wagga Field Days and this photo is a very good one of Dot with two of her visitors. Dot does promote her home radio club the Hornsby Club as well as ALARA but that is a good idea as she is very active in both societies.



Photo 1: The ALARA table at the Wyong Field Day 2016 - Irene VK2VAN, Dot VK2DB and Karen VK2AKB.



Photo 2: The girls at the new venue for lunch in VK5.



Jean VK3VIP and her group regularly participate in Field Days and Hamfests across Victoria. In the last month they have been at Heathmont and Rosebud and will be in Mulgrave in May.

It is great to be able to keep ALARA in the public eye. Although we are not big in numbers, we are nowadays an important part of amateur radio. Our presence is especially encouraging for young people. They can see that amateur radio is enjoyed by men and women.

### The regular ALARA luncheons

Both VK3 and VK5 have luncheons each month. Information is available from your State Reps. In Adelaide, we have been moving around within the city and suburbs to find a venue where the food is good, the price is good and they do not mind how long we sit a chat. The Police Club in Carrington Street was the last one we tried and we found it to be satisfactory so we will be going there for the next few months.

If you are visiting Adelaide, please contact Jean VK5TSX so we know to expect you at the regular luncheon. If you are there at a time of the month when there is not a regular luncheon, we can often meet you for lunch or coffee. We are fortunate that many of us live conveniently close to the city.

### John Moyle Field Day

There were five ALARA members at Womberoo, near Swan Reach, this year for the John Moyle Field Day.

### SK Jill Weaver VK6YL

Bev VK6DE has informed ALARA of the recent passing of Gillian Weaver VK6YL. More information and photos will be provided in the next issue.



Photo 3: Tina VK5TMC and Christine VK5CTY operating in the John Moyle FD.

### The YL International

It is not too late to decide you are going to the UK for the BYLARA International meet in October this year. Details are also available for CLARA.

All the details were in the previous *Amateur Radio*; I can send them to you directly if you wish. My email address is [geencee@picknowl.com.au](mailto:geencee@picknowl.com.au)

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Christine VK5CTY



Photo 4: The five YLs at the John Moyle. Sitting: Tina VK5TMC and Christine VK5CTY. Standing: Deidre, Jenny VK5FJAY and Jeanne VK5JQ.

### Help us

Contribute to the **Weekly WIA News Broadcast**. See our website for details.  
[www.wia.org.au/members/broadcast/contribute/](http://www.wia.org.au/members/broadcast/contribute/)





# VHF/UHF - An Expanding World

David K Minchin VK5KK

## Introduction

The summer Tropo season is over! A quick summary of what was seen around the country heads up the column this month. Also we have a report on mmWave path losses and portable activity.

Rounding up the column in this month's technical corner we have the continuation of "SDR on VHF and above" series as well as Kevin VK4UH's comprehensive guide to ST (Short text) in WSJT modes.

## Tropo round up for March 2016

The last reported Tropo opening between VK3, 5 & 6 was over a 14 hour period from 24/3/2016 to 25/3/2016 with WSPR reports between VK3ZAZ/RMV, VK5AKK and VK6DZ. Maximum distance = 2193 km. Signals did reach some strong peaks but rapidly disappeared after midnight.

Conditions extended to the east coast of VK the days following but in typical late season fashion it was mostly less than 500 km. No recorded propagation on these paths above 432 MHz.

With the El Nino in the north west Pacific expected to reverse in late May 2016, one can only hope we see an improvement in the 2016/17 Tropo season in VK/ZL!

## Out and about on 47 GHz again!

A couple of months ago I reported on VK5TE & VK5KK's 47 GHz portable operations on Australia Day using a bare mixer running ~ 0.2 mW into a 300 mm dish. It was more an exercise to tweak things and see just how far you can go,

Frequency (GHz)	Pressure (mB)	Temperature (C)	Water Vapour Density (g/m <sup>3</sup> )	Specific Attenuation (dB/km)	Total Gas Loss (dB/km)
47.088	1013	26	15.1	Water Vapour Loss 0.245 dB/km Oxygen Attenuation 0.115 dB/km Dry air continuum Loss 0.007 dB/km	0.366
24.048	1013	26	15.1	Water Vapour Loss 0.329 dB/km Oxygen Attenuation 0.007 dB/km Dry air continuum Loss 0.006 dB/km	0.342

Photo 1. Calculated water and oxygen losses on 24 & 47 GHz.

in the end 72 km without too much effort from PF94gq (350 m ASL) to sea level at PF95gh.

Picking the next day to go out has been difficult, the same humid on shore winds that have hampered Tropo conditions this year were around right through February. The daytime Dew point was around 20 C and not much lower at night. Where are those dry north winds when you want them!

To date we had only done some basic path loss calculations, given the prevailing conditions we now had to get more serious if we wanted to go further. Water vapour becomes an issue at 24 GHz as that frequency is very close to the first resonant mode of a water molecule. At 47 GHz water loss does drop but atmospheric absorption becomes an issue. Above that there are a number of peaks in absorption usually near amateur allocations,

122 GHz is particularly bad! There are a number of ways to calculate cumulative water vapour and atmospheric losses. I went looking for "Apps" that I could use on my mobile phone so this could be done in the field.

There are several around to calculate dew point or absolute humidity (water present in g/m<sup>3</sup>) from temperature and humidity. I use the Michell Instruments "Humidity calculator" App on Android, no doubt available for iOS as well. Looking for a path loss calculator there are a few Apps that will calculate free space path loss, but nothing that factors in the water and atmospheric losses discussed above. VK3UM's path loss calculator <http://www.vk3um.com/atmosphere%20calculator.html> factors all this in plus the height at each end. There is also a simpler program by Mike Willis G0MJW



called "gas Loss Estimator" <http://www.mike-willis.com/software.html> The algorithms used in both are based on those published by the ITU (ITU-R P.676-6) in 2005 so accurate to 180 GHz. I've included the calculated path losses for 24 & 47 GHz for 26/1/2016. It is sobering when you see that 47 GHz losses were 0.4db per km on our first day out.

Armed with some data on our paths, Simon VK5TE and David VK5KK went portable on 3/3/2016. Two over the land paths were selected with Simon VK5TE based at PF95ib (410 m ASL) Coach Rd 6 km of east of the Adelaide CBD. VK5KK was to go portable to PF95ht Salter Springs (260 m ASL) 82 km away and PF96ca on a hill West of Nantawarra (225 m ASL) 114 km away.

After an early start VK5KK arrived at PF95ht at 8 am. The forecasted northerly wind had shifted overnight to an on shore wind. Simon was in sea mist and VK5KK couldn't see the Adelaide Hills! Deciding to stick with the plan, both 0.2 mW 24 GHz and 47 GHz systems were set up and QSOs

were managed on both bands after a bit of optimising. The 0.2 mW was just 51 on SSB over the 82 km path on 47 GHz.

Over the next two hours signals increased as the sun cleared the mist. There are two BOM weather stations almost directly along the path so loss could be calculated regularly and compared to the increase in signal level. As the Dew point dropped from 23 C to 12 C, 47 GHz signals increases by around 10 db, very close to what was calculated. By now signals were reasonably good on 47 GHz both ways. Based on the calculated 0.3 dB/km path loss, the 10 dB signal increase had gained us another 30 km of range squaring away the extra distance to PF96ca (114 km).

VK5KK moved to PF96ca. It was midday now, the temperature had risen to 33 C and the wind had picked up from the south. Dew point had risen to 16 C; VK5TE's signal was 14-15 dB down and barely CW copy.

In the reverse direction VK5TE could still hear VK5KK's 30 mW signal on 47 GHz quite well. Signals averaged the same level one way

for the next hour so it was decided to try the 125 km path from the VK5RLH repeater site, near the Lochiel PF96bc (410 m ASL). It wasn't on the original plan as a 4WD is needed to get to the top but it was hoped that there would be a path from the bottom of the 4WD track (340 m ASL). A quick call to the owner of the property to gain access and VK5KK was on the way.

Upon arriving at the base of the track a quick direction fix to VK5TE confirmed that half of the hill was in the way! The choice was to walk several hundred metres with all the equipment around a steep hill or have a go at the rough track in the FWD VW wagon! The later appealed although some of the loose rocks didn't! The VW managed to get most the way up the track until the DSG didn't have a low enough gear to keep going at the 380 m point. Luckily there were just now a few trees in the way so moving about 6 metres down the hill cleared those. VK5TE could hear VK5KK signals about 3 – 4 dB lower than the previous site on 47 GHz. Unfortunately there was now only just a trace of Simons CW beacon

*Photo 2. About as far as you can get on this track with a FWD wagon!*







Photo 3. VK5KK 24 & 47 GHz portable at Lochiel.

on peaks on 47 GHz, interestingly 0.2 mW on 24 GHz had totally disappeared probably indicating that humidity had risen even further.

The next trip we will take our laptops as signals were more than good enough to use JT65a. And we will wait for the dew point to drop to zero (winter) so we gain another 8 – 10 db on the path!

BTW: The aluminium tripod in the photo is a Miller fluid head conversion of a Bosch surveyor's tripod (~\$80). Very easy to do and much more stable than the old wooden tripod!

### 3.4 GHz QSO Party Take 2

By the time you read this it will have happened! On ANZAC day, the second 3.4 GHz QSO Party will take place across VK & ZL. Send in your photos and experiences, of interest will be the longest distance achieved between two of these 1 Watt transverters. The good news is that the Geelong club expects to have more available by the time you read this. Rumour has it that the 3<sup>rd</sup> QSO party will be at the SERG Mt

Gambier convention held on the 5/6<sup>th</sup> of June 2016.

### SDR on VHF and above - Part 2

Last month we covered briefly the history and various "Generations" of SDR as it has evolved. This month we will explore what advantage SDR can give over conventional analogue techniques.

To be upfront, it is fair to say that good specification receivers, in either technology, will deliver much the same sensitivity on the test bench. However in the real world usability more depends on the dynamic range, IMD, base noise figure and noise characteristics of the receiver. At the high end SDR performance can and does eclipse conventional radio technology on a number of levels hence its widespread adoption in commercial use today. Lower specification receivers that amateurs invariably use have a number of design compromises. The difference between the technologies is as much about how SDR can improve

on these shortcomings as it is about SDR's extra features.

In the left corner we have our usual VHF/UHF radio that we use for weak signal and digital work. With rare exceptions, the overall performance of the average commercial VHF/UHF SSB transceiver is usually a step or three behind that of a good quality HF transceiver. They are usually double or triple conversion with anything up to a dozen gain stages at RF and IF frequencies, multiple filters, active mixers, oscillator phase noise, inadequate stability, etc. Not only does each section generate some noise but also potentially can introduce some distortion and/or phase changes to the signal. Add a microwave transverter in front of all that with 20 dB more gain and you have a pretty noisy receiver that could have some IMD issues!

In the right corner we have our modern SDR receiver. We are chasing weak signals so for the exercise we will assume a reasonable quality generation three SDR receiver. The HPSDR or



HiQSDR with a 16 bit A/D converter rated at 135 MFlops is a good example, there are also commercial transceivers of similar spec. Good SDR design usually sees 6 dB per bit dynamic range (so 96 dB in this case) and system gain set so noise only toggles the last 2 bits (LSB) for optimum operation. The maximum operating frequency of the SDR is usually under half the MFlops rating, in this case 55 MHz.

There are some other design considerations for our SDR we need to consider. The analogy of just plugging an antenna straight into the A/D chip is not quite right; if you have used one of those SDR dongles in a high RF environment you will already know this! It is important to use bandpass filtering in front of the A/D converter to minimise overload from strong out of band signals. Selectable narrow bandpass filters, ideally <5% bandwidth, are desired for direct frequency use. For our 144 or 432 MHz receiver, we need one stage of heterodyne conversion so we can use a fixed "roofing" filter at say a 50 MHz IF. Add a low noise front end with a high intercept mixer, a well filtered DDS local oscillator, some DSP after the FPGA and you have a very good state of the art SDR receiver constructed for under \$1000.

Okay, we have our two receivers ready to go. How do they differ?

### Dynamic range

I have put this first as it determines the overall usability of a receiver. Once upon a time, dynamic range and strong signal handling was not a big concern on VHF/UHF. Not so now, try operating portable on a hill top these days if you have a digital transmitter nearby! Or on 3.4 GHz next to a WiMAX site, it's not so much interference from the actual site but that from the hundreds of subscriber units pointed directly at you with millivolt signals!

The average VHF/UHF transceiver is a 10 – 30 year old design with mediocre dynamic range and fairly basic RF filtering.

Many have a broad receiver front end to cover adjacent bands so you get a 20 to 50 MHz slot of RF travelling right through the first mixer to the IF filter. Add a fairly noisy PLL local oscillator and the crud you hear is probably a mixing product from an overloaded gain stage well inside the receiver.

Our SDR has a minimum of 96 dB dynamic range and a good (~250 kHz wide) roofing filter so is better able to cope with a modern RF environment than our old VHF/UHF set.

### Noise and distortion

Conventional VHF/UHF radios can have 90 – 100 dB gain before the detector, each stage of amplification contributing some noise and distortion. The Gen 3 SDR receiver may only have one or two amplifying stages before the "detector" (10 – 20 dB) so has far less added RF noise and distortion pre detector. The difference? The SDR receiver has a much lower noise floor and will be "quieter" to listen to. Both systems may have similar sensitivity but with digital modes on a SDR there is usually a 2 – 3 dB gain with the "cleaner" signal at threshold detection.

### Passband filtering

The average VHF/UHF transceiver usually only has a basic IF filter. Adjacent signal rejection is not so much the problem but passband ripple is. A number of transceivers (i.e. FT-817, etc.) now use ceramic filters at 455 kHz to reduce cost. Crystal filters have become more expensive/harder to get and Collins has just stopped making 455 kHz mechanical filters! Ceramic filter passband ripple can be 3 dB or more across the passband. A design issue in a number of FT-817/857/897's has seen ripple get worse with time. If you have "scratchy" audio you probably have a passband problem.

Passband ripple and phase change causes problems when receiving digital modes. Especially weak JT4/JT65 signals as multiple tones are spread a few hundred Hz. Tones appear at varying levels and don't decode as easily, the impact

can be as bad as the ripple, i.e. 3 – 4 dB degradation. In comparison, a SDR receiver has block filters in DSP software, typically <1 dB ripple across the entire passband. For digital modes even a basic SDR receiver with good software will show an improvement over the average VHF/UHF radio!

### Signal detection

Digital detection techniques achieve the same results but differ greatly from analogue techniques. A digital detector can output via a D/A for audio or directly to a decoder for digital modes. Digital modes are where SDR is well ahead, our VHF/UHF radio has only a <3 kHz audio bandwidth signal needing further shaping and an A/D process before data can be decoded.

SDR has opened up new digital modes. Check out FreeDV especially the new 2400A mode for VHF ([www.rowetel.com](http://www.rowetel.com)). W1JT's MAP65 program allows a PC to connect directly to the I/Q output of most Gen 1 SDR radios to process JT65 signals over an 80 – 100 kHz bandwidth. A popular implementation of SDR is using this combination as the back end of an existing VHF/UHF radio. Usually connected to an IF stage before the main filtering, something like a Flex 1500 or even an SDR dongle will get you going.

### Digital Signal Processing

DSP can be used with either technology so there are similar advantages for SSB/CW operation for both. Indeed there are a number of conventional radios that do have DSP at audio or a 10 – 20 kHz IF. The SDR difference is that DSP is usually an integral part of the digital detection process and can be upgraded as technology changes through software. DSP can offer a myriad of filters implemented in software as standard/ no extra cost, a far cheaper option than conventional crystal filtering.

Waterfall and spectrum displays. A very important feature for weak signal work enabling the visualisation of weak signals well below what is audible. Those that



have used Spectran or WSJT/X on a PC/Laptop will know what I mean. Having that display in a radio is far more intuitive making it possible to judge signal levels above noise. Most new standalone SDR radios (homebrew or commercial) have a colour LCD to display everything that is going given on. Having a real time spectral display on this display is a trivial side process off any DSP. It sort of makes an S-meter redundant.

**Summary** - There are a number of advantages using SDR over conventional analogue radios for weak signal work. For digital modes there are some clear advantages depending on what you use now. As extra operational conveniences like DSP, touch screens, spectral displays, filtering, etc. can be incorporated at minimal cost, demand may well see SDR in all new releases. In five years' time, SDR could well replace all but the most basic analogue transceiver platforms.

Next month we will look at the various options around for VHF/UHF SDR front-ends and some design considerations.

### In closing

That's it for this month. Feel free to drop me a line if you have something to report. Contributions regarding club projects or proposed activities are always welcome. Just email me at [david@vk5kk.com](mailto:david@vk5kk.com) and I'll include in the column.

73

David VK5KK

## Meteor Scatter

*Dr Kevin Johnston VK4UH*

In the March AR column I offered an introductory guide intended for newcomers to Meteor Scatter Operating. Although this was itself a revision of an earlier article, clearly many current operators had not seen it first time around and I am very grateful for the generous and

complimentary feedback I have received on its usefulness.

This month I also received requests for information on the use of ST (Short-Text or Single-Tone) mode in WSJT. In reply I have revised my earlier article on operating strategies when meteor Scatter conditions are poor, which covers this topic. On poor days MS is characterised by pings which are weak, infrequent and brief – “the triple whammy”. I recall mornings when I have failed to complete a single QSO. Even under poor conditions however there are things worth trying to improve the success rate. Consider the following strategies:

### Making the most of what you receive

Using the FSK441 mode, when conditions are good, it is possible to just sit back and let the computer do all the work. At the end of each receive period the WSJT programme itself will identify pings of FSK441 signals, apply a red marker on the waterfall, and a decode appears in the receive text window. You could even do this with the speaker volume turned down! This however is never the way to get good results, particularly when conditions are poor. Firstly, left to its devices, the programme will only attempt to decode one ping, usually the loudest, from each period. Where there are multiple pings the remainder will be ignored. On weaker pings, the programme may not even identify them as FSK441 and again will ignore them. A more effective way to operate, especially as conditions deteriorate, is to turn the speaker well up, turn the AGC off where possible and manually force decodes on-the-fly by mouse clicking on each and every ping heard. It will also improve success to have multiple attempts on weaker pings with different settings of the threshold “S” parameter. The range of possible “S” settings is from -9 to +9. Lower settings produce more on-screen garbage, higher settings

will eventually prevent all decode attempts. Remember also that on longer burns from hyper-dense meteor trails, there may be signals from more than one station in each ping. It is worthwhile scrolling very carefully across these, forcing multiple decodes particularly at each end of the trace.

### Be realistic – common sense works

It is neither possible nor necessary to have a perfect decode every time. We wouldn't require that on SSB or CW either. A degree of corruption of the received string can be accepted. A single character missed or corrupted can be accepted – just like on phone.

E.g. “**JK4UH/RRR VK3AMX**”.

This is clearly a report to me with loss of certainty at the ends of the string as the meteor ping is fading. There is no JK prefix and I am in the middle of working VK3AMZ – hence the RRR report.

What about “**\$%4UH/RRR VK\*76**”. This too can be OK if I am only at the RRR stage with one station or I can identify the source of the report by another means. For example if VK3AMZ consistently has a “DF” frequency offset of 42 Hz on all previous pings and this partial string has the same frequency offset then this too is valid. Bear in mind that accepted protocols in other digital modes, such as JT65 EME or CW EME, do not require callsigns at all for some steps of a QSO, only OOO, RO or RRR reports being transmitted. Remember too that the QSO is considered complete when the RRR report is received. The 73 is really just a courtesy to advise the sending station to stop sending RRR and to move on. The same is obvious if the receiving station changes back to CQ or starts reporting to another station.

### Shorten the String

The fundamental advantage of digital communication for all weak signal communication, including for MS, is repetition and redundancy.



The same transmitted "message" is repeated time and time again by the transmitting station until a random meteor return conducts it to the receiving station. Using FSK441 mode a transmitted message, the "string", is encoded using four audio tones at 882, 1323, 1764 and 2205 Hz being transmitted at a rate of 441 Baud and transmitted for a precise period of 30 seconds from each minute. Each letter or character in the available 43 character alphabet is represented by a sequence of three tone transitions requiring 2.3 ms for transmission. Each specific audio tone, when transmitted through an SSB transmitter, produces a single carrier frequency on air which produces frequency shift keying (FSK) as the audio tone changes. In the SSB receiver at the other end the four carrier frequencies are transposed back to the four audio tones.

The FSK441 format in WSJT allows for a maximum string length of 28 characters thereby allowing the entire string to be conducted on an average meteor return of 100ms duration or greater. Typical strings include the callsigns of both transmitting and target stations and one of a number of reports or signals. Examples might include **"VK3AMZ/26 VK4UH"**, **"VK3AMZ/RRR VK4UH"** or **"CQ VK4UH"** etc.

In this VK/ZL MS protocol the use of the "/" character is used between a callsign and a report to designate the target station. This improved clarity, particularly when conditions are poor; where there are multiple stations operating and where partial decodes are common. The callsign of the originating station will always have a clear space at either end while the target station(s) will always have a "/" at the end.

When conditions are very favourable, with long and loud pings being received, then it is possible to be conducting QSOs with two or even three stations simultaneously by carefully using the maximum

28 characters. E.g. **"VK3AMZ/26 VK3HY/R26 VK4UH"** or **"VK2BLS/73 VK5PJ/R26 VK4UH"**. Pushing even further and stripping out the prefixes **"2AMS/26 3HY/R26 4EA/73 9NA"**. This of course is a trade-off, the longer the string the less statistical chance there is of receiving a complete decode. When conditions are poor, the shorter the pings and the weaker the returns it is common to lose more than is gained by operating in this way. This is compounded in meteor scatter work as the received signal is not of constant strength through each ping. At either end of a ping the signal is weaker leading to more uncertainty and more on screen "garbage" at each end of the string. The key to success under these conditions is to shorten the string as far as possible, removing all unnecessary characters and spaces and to abandon attempts to work multiple stations. E.g. **"3AMZ/R26 4UH"**. If you imagine the logical extrapolation to where only a single letter **"R"** with no spaces was transmitted then the chance of a decode would be very high indeed. To be clear, the more characters sent in the string, the less chance of decoding.

### Parallel decoding (MSRX)

MSRX (Meteor Scatter Receiver) is an alternative software programme for Meteor Scatter. Like WSJT, MSRX is freely distributed for amateur use. This is a **receive-only** system capable of decoding both FSK441 and PSK2K meteor scatter signals. Operating with this programme is quite different from WSJT. Firstly MSRX does not monitor directly off-air. It can only decode from existing captured audio files. When configured appropriately, at the end of each receive period the normal WSJT programme writes a .wav file to the computer hard drive containing the raw audio signal as received during the last period. MSRX can be left running in the background and can be configured to read these

.wav files to have a "second go" at decoding. The decoding process is fundamentally different between the two programmes in a number of ways. Firstly, unlike WSJT, MSRX automatically attempts to decode all received pings irrespective of received signal strength. There is no equivalent of the threshold or "S" setting in WSJT and it is not possible to manually force a decode. MSRX indicates the level of confidence in decoding by changing the density of the typeface on screen characters. More importantly the programme seeks repetition of character sequences across multiple pings and will frequently produce a complete and accurate decoded string, by stitching together sequences decoded across a number of pings within a single receive frame where only partial or corrupted decodes were found in WSJT. MSRX can also be configured to highlight specific sequences such as specific callsigns or just suffixes as a further aid to reception. So even though MSRX is not decoding in real time and its output does not usually appear on screen until well into the next Tx period, it can be a very useful aid to success particularly when conditions are poor.

### Consider alternative modes

There are alternative digital modes to FSK441 for Meteor Scatter, often under continuous development. ISCAT and PSK2K are unlikely to help when conditions are poor. The former is more suited to 6m MS operation where the pings are of longer duration and the latter useful when conditions are enhanced. In the authors experience the only serious contender for use during poor conditions is JTMS (Joe Taylor Meteor Scatter). Uptake of this new mode within Australia and New Zealand has been disappointing slow. JTMS is available in the later versions of WSJT and was present as a hidden file in earlier versions. On screen the JTMS mode appears essentially identical



to FSK441 and the transmitted audio is indistinguishable by ear. The decoding process is quite different however and cannot be covered in detail here. Suffice to say that the mode appears to give an advantage when conditions are poor and appears to provide decodes on very short pings below 100 ms where FSK441 struggles. On the downside the setting of the "S" parameter is critical and has to be varied between loud and weak pings in order to get decodes. Also there is significantly more on-screen garbage at either end of received pings. More importantly the two modes FSK441 and JTMS are entirely incompatible; neither mode can be decoded by the other receiver. Consequently they should not be used concurrently on the same working frequency while other stations are operating. In VK or ZL it would be advisable to move to the secondary MS frequency 144.330 to use JTMS during activity sessions at least. Another drawback is that the current version of the MSRX suite is unable to decode JTMS for the "second go" as above.

### ST mode

Another very valuable tool in the MS armoury is the "ST" (Short-Text or Single-Tone) mode. This mode is available from within all versions of FSK441 and is activated by checking (ticking) the Rx ST and TX ST Boxes on the WSJT working panel. In this mode one (only) of the four basic audio tones is transmitted constantly during the transmit cycle. Each of the four tones is used separately to code for the four possible reports:

882 Hz=R26, 1323 Hz=R27, 1764 Hz=RRR, and 2205 Hz=73.

Each specific audio tone produces a specific on-air blank carrier of course, only its frequency carries the information as there is no other modulation to be detected. Even the shortest detectable ping, well below 100 ms, will be decode as one of the reports, will show as a bright spot against the corresponding calibration lines on both of the WSJT panels and can easily be distinguished by pitch with the unaided ear.

There are a few provisos when considering this mode:

Only one of the four reports as above can be transmitted. There is no information to identify either the source or destination station. Before use therefore there must have already been an exchange of callsigns and in practice therefore the first normal report sequence i.e. VK3HY/26 VK4UH must have been received. Secondly only one pair of stations can be using the ST on a particular frequency at the same time. Realistically this limits the use of this mode during normal activity sessions except by arrangement.

It is reasonable to wonder if this is a valid exchange. It should be remembered that in digital EME QSOs using JT65 and also in a CW EME QSOs, once callsigns are exchanged, then the subsequent confirmation reports RO, RRR and 73 are also sent by an alternating single tone sequence in JT65 or plain CW in that mode without any other information indicating source or destination stations.

Experienced MS operators will frequently switch to ST mode to complete an established but difficult QSO when conditions are deteriorating. Single tones are easily distinguishable by ear to

indicate that this course of action has been taken. On a practical note when using ST, it is necessary to have only the required report in the Transmit message window. No callsigns or other characters. When working correctly the on-screen message in WSJT will change from yellow to blue to indicate ST is operating. If monitoring the transmitted audio signal only a single audio tone will be heard. This by itself is useful to train the ear to the tones to be listened for. Is it reasonable to indicate that ST mode is being selected to complete a QSO via facilities such as the VK Logger? Well this operator at least believes this to be an acceptable practice, as long as the report itself is not disclosed by any means other than reception on-air.

### General

Other common sense tactics apply including pre-arranged operating times, activity sessions and fair use of resources such as the VK Logger. Be persistent, get up earlier, get as much power as possible up to the antenna feed point and encourage others to try this mode of propagation. The more stations on-air the more chance of a successful QSO!

I would welcome any reports from the Lyrids Meteor Shower which occurred around 22<sup>nd</sup> April 2106.

The next Meteor Shower on the calendar will be:

**Eta Aquariids** - peaking around 6<sup>th</sup> May 2016

Dr Kevin Johnston VK4UH  
Brisbane  
[vk4uh@wia.org.au](mailto:vk4uh@wia.org.au)



**Moorabbin and District Radio Club - VK3APC**  
PO Box 58 Highett 3190

**Saturday 7th May, 2016 HAMFEST 2016**

**Southern Community Centre - Rupert Drive, Mulgrave**

See <http://mdrc.org.au/> for details. See also the IC-7300 on display at the Icom stand.





## South East Radio Group

### 52<sup>nd</sup> Convention and Foxhunting Weekend



#### When

**Saturday 11<sup>th</sup> and Sunday 12<sup>th</sup> June 2016**

Doors open Saturday 7<sup>th</sup> at midday and 9:00 am on Sunday.

#### Where

Mount Gambier Scout Group Hall in Margaret Street, Mount Gambier.

#### Catering

Excellent, reasonably priced catering will be continuously available for the duration of the convention including the famous steak sandwich, soup, hamburgers, Sunday breakfast selection, cakes and goodies, coffee, soft drinks and of course a happy smile from the helpers.

The highly successful Convention Dinner on Sunday evening will be repeated this year.

#### What

The Australian Fox Hunting Championship is a highlight of the event. Beginning at 11:00 am on the Saturday the nine event programme runs until early Sunday afternoon. Some events may need physical agility and speed, others guile and there is always an event or two to surprise and challenge the competitors.

A home brew competition with great prizes will be held as is our tradition and there are tables of new equipment, pre-loved gear and parts that no shack should be without.

Entry fee is \$5 for the weekend and this includes the lucky door prize raffle. For table bookings contact our Secretary on [vk5sr@wia.org.au](mailto:vk5sr@wia.org.au)

### Contact us

Programme information and where to find us may be found on the club website at <http://serg.mountgambier.org>

Accommodation should be booked early as this is a busy weekend in Mount Gambier.





# VK3news Geelong Amateur Radio Club

Tony Collis VK3JGC

## The GARC Training Program

During the course of the year around 25 members of the public are trained by the GARC trainers to acquire the basic Foundation licence, or upgrade to a Standard licence or move on to the Advanced licence qualification.

The training sessions on Friday evening's start at 7 pm and are **free of charge** and also do not require membership of the Geelong Amateur Radio Club to attend; simply go to the club website at [www.vk3atl.org](http://www.vk3atl.org) and contact us. On accessing the web site clicking on the **education** tab provides the basic information regarding the three licence levels and the related costs associated with the formal examinations.

The GARC can provide the **Wireless Institute of Australia's** "Your Entry into Amateur Radio" manual for \$20; this document is the basis of the Foundation licence course.

The Foundation licence examination comprises 25 multiple choice questions, the Standard Licence has 30 multiple choice questions and the Advanced Licence has 50 multiple choice questions. At each level a 70% pass rate is required. The practical aspect on operating procedures, however, requires a 100% pass to complete.

The Technical and Regulatory aspect training is done with a combination of a white board and



Foundation licence pupils and three of the GARC's Trainers

The top picture below shows a current Foundation licence class with two couples Fiona and Marcus and Julia and Zero along with Trevor. Bottom left is Rex VK3ARG who deals with the Regulatory side of the hobby. In the middle is Ken VK3NW who deals with the hands on practical aspects. Finally, Chas VK3PY who deals with all the technical aspects associated with amateur radio.

PowerPoint using an overhead video projector. The hands on elements are dealt with in the VK3ATL radio shack by Ken VK3NW with on air contacts to establish

procedural competence. Access to a well-equipped workshop is also available to students.

73  
Tony Collis VK3JGC

## Promote our hobby



## Have you considered using your unwanted **Amateur Radio** magazine to promote the hobby and the WIA?

Consider taking it to the office of the your local health professional (doctor, dentist, etc.).

You never know, **you might stimulate someone** to consider taking up our hobby!



# SOTA & WWFF News

Allen Harvie VK3ARH

It has been a calm month with great weather and propagation, well not entirely. A quick review of the spots for the month shows that it was in fact hectic with nearly 300 activations successfully completed. This covers 96 WWFF parks and 195 SOTA summits.

The Easter long weekend accounted for 100 activations over four days:

VK3OHH activated 9 SOTA summits  
VK3YY & VK2WU 5 SOTA summits each

VK5ZPF activated 3 WWFF sites  
VK5GY, VK3TST, VK1DI & VK2YK collected 2 WWFF parks each.

Whilst a review of the data for the rest of the month shows that:  
VK2QR collected 19 SOTA Summits  
VK3ANL 13 activations including 6 park, 3 Summits and four shires  
VK2IO 7 summits for 3 parks  
VK2TWR, VK1RX & VK3CAT 10 summits each

VK1AD 9 Summits

VK2CU & VK3ARH 7 summits each  
VK4AAC 7 WWFF Parks

VK1AT & VK5HSX for 6 WWFF Parks

VK3VTH & VK5PAS for 5 WWFF Parks

VK3BYD & VK2WU picked up 5 SOTA summits each.

There were a couple of successful digital activations with Marcus VK3TST and Ron VK3AFW both gaining VK and ZL contacts (PSK31 or JT65) on separate activations. These activations are creating interest within the SOTA community, as the purists challenge the carrying of extra equipment.

Don M0HCU picked up three associations by activating Mt Ainslie VK1/AC-040, Mount Gibraltar VK2/IL-001 and Huon Hill VK3/VE-237 whilst visiting Australia. There were also three ZL summits, Rangitoto ZL1/AK-016, Kauri Mountain ZL1/NL-



Phil VK3BHR/p on SOTA summit Mount Misery Range VK3/VK-008.

079 and Mount Parihaka ZL1/NL-076 activated during his visit down under.

Brian VK3MCD (JM8ITC) qualified Mt Hakodate JA8/OM-066. His first chaser was Rick VK4RF. This makes Rick the first Chaser to contact a JA8 association summit and Brian the first to activate the association. Brian continued to collect another three JA/TG-048), Ooyama JA/KN-006 and Shiroyama JA/KN-022 during his visit.

## Tales from the front

Phil VK3BHR and XYL Kathy headed off to claim two unclaimed 10 point summits over the weekend of 5 March mounting a serious 4WD expedition to Benambra to claim first activation rights. Phil had been watching these on the Summits Database for over 18 months decided that "Something Had to Be Done!" and now was the time.

Before leaving, he phoned the Swifts Creek office of the Department of Environment, Land, Water & Planning to check on road conditions in the area. A rather helpful voice on the other end of the telephone suggested that "Misery Trail and Dapples Creek Track are open, but I wouldn't take a Camry up there!"

It was decided to attempt the Misery Trail option as it went very

close to VK3/VG-008. After some serious rock climbing in 4WD low range, he made it to the top. It wasn't too bad, really, but the previous comment about the Camry was spot on - the track was #\$\$\$#! rough.

The activation itself was easy. Conditions on 40 were good and 20 contacts were easily made. The equipment used was a home-brew 10 W SSB transceiver powered by some tired NiMH batteries, a 7 m squid pole and an inverted V dipole fed via thin coax.

VK3/VG-009 was next. After what seemed like 20 km of rough driving, but was probably more like 5 km, we were able to drive to the top, and then back down 30 m (vertically). A leisurely walk back up then put us at the top - and just inside the Alpine National Park boundary. Again, the activation was easy and the view unspectacular - but no emus this time. We departed via Dapples Creek Track. This was a much better track & could easily be done in an ordinary car (even a Camry).

'Looking forward to more remote activations from Phil'.

Thanks to Phil VK3BHR.

Tony VK3CAT headed off Easter Saturday for another serious 4WD



expedition bound for the Alpine NP with a number of summits planned. First being Mt Thorn VK3/VE-042 and not previously activated. The proposed route was along Stanley's Name Spur and went much as planned. Steep and some scrub bashing over 4 kilometres and a 360 metre ascent. It was a pleasant surprise to stumble onto an old fire track which made the steep going a little easier. The planning paid off with 8 x 40 m CW contacts, 22 x 40 m SSB contacts, 3 x S2S, DX to JA on 15 m CW and a JA S2S with JP3DGT/3 on 10 m CW.

Next he was off to Mt Speculation VK3/VE-022 about 25 kilometres away by 4WD but not before checking out possible access to the Pimple VK3/VE-057.

First setting up his swag at Camp Creek, Tony climbed the 166 metres over 1.2 km from the road to the summit. Despite running late

there were chasers waiting with Steve VK7CW and 15 other 40 metre CW chasers quickly secured contacts. The surprise here was a 40 m DX contact with Darryl WW7D near Seattle in Washington State (13000 km). Finally, in fading light, it was time to try 20 metres, so put out a spot for 14.062 CW. First 20 m contact was with Kurt HB9AFI/P on HB/BE-123 on the long path then John VK6NU for a S539, R 519 but valid contact. With fast failing light Tony called it a day and headed back to camp for dinner and a cooling ale. Great results for the day: a brand new summit, 2 DX S2S and a DX also to JA and NA and the local chasers and S2S contacts.

Sunday saw Tony taking a trek out along the AAWT to Mt Despair and back then heading back to a camping spot at the start of the Mt Thorn access route via VK3/VE-103 (a steep 4WD access track).

Monday involved an activation of Mt Buller VK3/VE-008 before the drive home in Easter peak hour holiday traffic.

Checkout Tony's blog at <https://vk3cat.wordpress.com> for more detail and great pictures.

Thanks to Tony VK3CAT.

### **Reminder that the SOTA CW net has moved to 80 m for winter.**

We will be on air to give practice in sending and receiving for basic QSOs suitable for SOTA exchanges. 3540 kHz +/- with usage starting at 2030 EAST. New participants welcomed.

Whilst 4WDs help with access, don't forget to check road conditions as a part of the planning process to ensure access, thus making a successful activation.

Until next time,  
73 & 44,  
Allen VK3ARH.

## **Silent Key**

**Ian James Hunt VK5QX**

17 June 1933 to 26 February 2016.

Ian died in the early afternoon on 26 February 2016 after an illness lasting several years. He is survived by his beloved wife Sylvia, nine children including six from a previous marriage to Margaret, 15 grandchildren and 14 great-grandchildren.

In his early working life, he served in the Australian Army Signals Corps from 1951 to 1954 before joining the then Weapons Research Establishment at Salisbury SA, now Defence Science and Technology Group, Edinburgh. He worked in the communications area on telemetry systems.

Ian had his interest in radio kindled as a boy and became a keen SWL. He obtained his first call sign in Victoria in the early 1950s. He was always ready to help out amateurs starting out in the hobby with advice and help to get them on air. He was a great supporter of the Wireless Institute of Australia, serving as VK5 Secretary twice, two terms as Federal Councillor for VK5 and was president of the VK5 Division of the WIA during 1980-1981 and 1997-1998. In recognition of Ian's service to the WIA, he was made a Life Member. He was for a time, a member of his local radio club,

the Elizabeth Amateur Radio Club. During the late 1970s and early 1980s, he was a regular participant in VK3 WICEN activities held in conjunction with the Red Cross Murray River Canoe Marathon and he assisted the Scouts with Jamboree On The Air.

Ian was a keen SSB operator with over 300 countries confirmed on 20 metres and during the 70s and 80s he maintained regular skeds with overseas amateurs especially in the USA. He did "tele-typing etc. on the big old clunky messy teleprinter machine" (Sylvia's words) before computers came into the hobby and later transferred this interest to packet radio. During the 70s and 80s, he was a very keen (Sylvia says fanatical) contest operator and for one particular contest, set up equipment at the Army depot at Smithfield where a large rotatable log-periodic antenna was located. He was very proud of his Australian Contest Champion trophies which he won for several years in a row, and he often took first place in the Remembrance Day Contest and John Moyle Field Day voice sections.

He was proud of his association with a DXpedition to Heard Island in the early

1980s and later he became acquainted with the astronaut Andy Thomas whom he contacted in space. During the 1970s and 1980s Ian was a very keen and active amateur. Although his interest in the hobby gradually faded during his later years, he still maintained his licence and station.

In addition to his strong interest in amateur radio, Ian took great pleasure in singing, no doubt enhanced by his membership in his youth of the Salvation Army Church where he also played the tenor horn. In 2003 Ian joined the Adelaide Male Voice Choir (AMVC) and for a time sang in the Metropolitan Male Choir of South Australia as well. He did a tremendous amount of work for the AMVC transcribing arrangements of songs by the choir's Music Director, Bill Shaw, to produce computer printable scores.

Vale Ian Hunt VK5QX

Acknowledgement is given for contributions from Paul Roehrs VK5NE, Steve Mahoney VK5AIM, David Minchin VK5KK and Sylvia Hunt.

Keith Gooley VK50Q





## VK7news

Justin Giles-Clark VK7TW

e vk7tw@wia.org.au

w <https://groups.yahoo.com/neo/groups/vk7regionalnews/info>

### Meet the Voice Event

<http://meetthevoice.org>

The MTV event is held annually in VK7 in the historic midlands township of Ross on the banks of the Macquarie River. 2016 saw it held on the weekend of 19-20 March. It is sponsored by the Sewing Circle Net (each night on 3.59 MHz). Many people arrive on the Saturday and setup in the caravan park and stay a few days with the main event being on the Sunday. Fortunately the weather was kind and cleared to a spectacular day on the Sunday.

Saturday saw a SOTA session in the afternoon which assisted in the tuning of a linked dipole and a lesson learned about ensuring connectors are terminated and assembled correctly. The main event on the Sunday was for the presentation of the Sewing Machine award to the most loquacious Sewing Circle Net amateur in the last year. This is chosen by the previous award recipient. The current holder Alvin VK7ADQ presented the award to Gavin VK7VTX from Flinders Island. Congratulations Gavin.

The raffle prize of a very nice dual band Baofeng hand held went to Tony VK7AU and the wine donated by Geoff VK7GW from Sterling



Photo 1: LtoR – Alvin VK7ADQ presenting the Sewing Machine Award to Gavin VK7VTX (photo courtesy of Justin VK7TW).

Heights winery went to Harry VK7AR. The substantial money raised from the day went to maintaining the repeater network across the state. There was a car boot sale and sales

appeared brisk. A SOTA workshop was also held on the Sunday which was well attended and some great feedback received. A group photo is taken each year to record attendees



Photo 2: Attendees at the MTV event during the presentations. MC Cedric VK7CL on the podium (photo courtesy of Alvin VK7ADQ).





Photo 3: MTV 2016 group photo. (Photo courtesy of Justin VK7TW).

for the VK7 archives. After the photo we repaired to the BBQ and enjoyed the rest of the day.

Many thanks to Alvin VK7ADQ, Cedric VK7CL, Rod VK7TRF and Dick VK7DIK who are the stalwarts who setup for this event each year and this year they were joined by Yvonne VK7FYM on the raffle and entry table. A special thank you goes to Brian VK7KBE for his portable (very steampunk) entertainment system and his collection of classic Smacka Fitzgibbon's jazz tracks that accompanied the weekend. Mark it in your diary for next year - Sunday 19th March 2017 for another great event.

### VK7 SOTA News

Thanks to Andrew VK7AW who let the author know about some special SOTA activations on the West Coast of VK7. Four amateur radio operators were moored in Schooner Cove, off the Bathurst Channel (Port Davey area). Rik VK3EQ from SY Juliet and Chris VK7JU from Golden Dreams climbed Schooner Hill (VK7/SW-170) and worked Andrew on Juliet and Jim VK4GFT on Insatiable II which was also anchored in Schooner Cove. Their remaining contacts were made on 40 m from mainland stations. Rik also climbed Mt Beattie (VK7/SW-163) from Claytons Corner (Bathurst Harbour, at the start of Melaleuca Inlet) and claimed another SOTA peak on the "wild west" coast.

### North West Radio and TeleVision Group (NWTR&TVG)

<http://www.vk7ax.id.au/atvgroup>

NWTR&TVG provided communications support for an Equine Endurance

Event in and around the NW VK7 township of Sheffield on March 5. All went well and thank you to the following amateurs who assisted: David VK7DC, Roger VK7ARN, David VK7VDS, Tony VK7AX, Bob VK7MGW, Ursula VK7ROO, Lucas VK7LSB and Dion VK7DB.

The RAOTC monthly broadcast is now relayed on the first Monday night of the month on voice repeaters VK7RTV, VK7RDR and VK7RAK, along with ATV & Video Streaming. The Sunday WIA and VK7 Regional News broadcasts now go out on the new 6 meter Repeater VK7RVP on 53.950 MHz and this repeater is located on St. Valentines Peak in NW VK7.

### Northern Tasmanian Amateur Radio Club (NTARC)

<http://www.ntarc.net/>

NTARC's March meeting was a BBQ followed by a general meeting and finished off with a show and tell session which saw Peter VK7PD showed off his tiny 25 watt dual band Chinese FM radio. The key feature of the radio being it was bright red and came with a full DTMF microphone. Trevor VK7TB then introduced his completely homebrewed automatic antenna tuning unit with what seemed to have infinite manual control. Trevor uses this to tune his delta loop at his QTH. The author has been told it was a thing of engineering beauty. On ya Trevor!

### Radio and Electronics Association of Southern Tasmania

<http://reast.asn.au/>

REAST's 23 cm QSO parties are continuing each Sunday with a few

new stations and upgraded equipment and antennas resulting in improved signal reports. Rex VK7MO is the net controller and starts on 1296.1 FM, moves to SSB and then WSJT to try contacting Joe VK7JG in Launceston.

REAST held a "Town Hall" early in March lead by President Ben VK7BEN. Many came along to the BBQ and then heard and inputted into the future direction for the club. In summary - higher levels of engagement with the community, more activities, more clubroom use, social media and constant communications were key themes. REAST is now on Facebook - search for Radio and Electronics Association of Southern Tasmania and you should find our page.

<http://www.facebook.com/reasttas>

Our DATV Experimenter nights continued throughout March with many segments including - Yagi boom correction with Rex VK7MO, Warren VK7WN & Richard VK7RO showed us a HP flatbed plotter and test print. We then showed a Roland flatbed plotter demonstration, LIPD and RF shielding, LoKey & DUBUS reviews, exploding SMPSU plug packs, 23 cm QSO party reports, RaspberryPi SPi Box, credit card chips and RFID protection from Steve VK7OO, 6 m & 2 m AM Valve Transmitters, WWII - AWA FS6 HF transceiver, telephone exchange uni-selectors, old phones, theatre ringers, Bass Link Cable from Joe VK7JG, SOTA & VKFF activation pictures and pyramidal holograms. Our videos included time-lapse - 1000 km in 7 minutes, TX factor, AmateurLogic.TV and many other interesting clips.





## VK6news

Keith Bainbridge  
e vk6rk@wia.org.au

Finally the temperature is starting to fall and antenna work becomes possible once more! After my tower disaster at home I will be able to install the new tower system and experiment with two Mag loop antennas, and be back on the air after a 5-month drama filled break.

To business:

### WARG

First this month we have news from Anthony VK6AXB who advises us on behalf of WARG:

In the lead up to our AGM on 2 May, WARG members continue to work on repairs and improvements to the repeater network. Mt Saddleback VK6RMS is back on air and working OK, save for the automated WIA news link – our thanks to Mac VK6MM who is manually relaying the news through VK6RMS each Sunday. A working bee has taken place to investigate the problems at Cataby VK6RCT. Further work is being planned for Kellerberrin and Roleystone sites. Negotiations are continuing with site owners regarding a full rebuild of the Mt William site following January's bushfire damage.

### SK Gillian Weaver VK6YL

Members were saddened by the sudden passing on March 20<sup>th</sup> of WARG Life member Gillian (Jill) Weaver VK6YL (SK). While Gill had not been an active WARG member for many years, her work in the 1970s and 80s was absolutely vital to WARG's success. In addition to serving as group Secretary for thirteen years, Gill effectively project-managed the site builds at Tic Hill and Busselton, where WARG members and supporters



Photo 1: Cherry Picker.

built two complete repeater sites from the ground up. Without Gill's energy, enthusiasm and organising skills, these key sites may not have been built. Discussion is under way within WARG as to the best way we can honour and remember the

achievements of VK6YL.

A reminder that **WARG's AGM** for 2016 is taking place on Monday 2 May, so if you receive AR early enough, there is still time to attend! The AGM takes place at our usual meeting venue, the Peter



Hughes Scout Communications Centre, located on the corner of Gibbs St and Welshpool Rd in East Cannington, doors open at 7 pm for a 7:30 pm start. Tea, coffee and biscuits are available, and there is usually time for socialising before and after the meeting, members and visitors welcome. WARG's technical and general net continues every Sunday at 10:30 am local time on VK6RLM, 146.750. More information will be on [www.warg.org.au](http://www.warg.org.au)

WARG thanks VK6RK for again compiling the VK6 Notes column; Keith, your efforts are appreciated.

Thanks Anthony, as is your input!

## HARG

HARG has been busy this month, over to Bill for an update.

HARG participated in the John Moyle Field Day in March using the club call sign, VK6AHR. Despite all our preparation, we turned up to our well scouted location in Marrinup (near Dwellingup) to find it full of mountain bikers and other campers. We quickly assessed our options & set up a little further away

from where we planned. It turned out to be a great spot as we were able to put up a 160 m triangular loop at about 15 m with the ladder line feed to our manual tuner almost overhead. Our new TS2000 transceiver and linear did a sterling job of making us heard across the nation. The cherry picker towed down for the occasion was mounted with our 3-element tri-bander with a 2 m/70 cm collinear above that. That got the antennas about 14 metres in the air. The cherry picker is an awesomely portable tower and makes set-up fairly straight forward. Ian VK6DW said that he was using the loop antenna in preference to the Yagi a lot of the time when he was operating and the club's 160 m signal was apparently quite strong.

Club members who operated the radio were Ian VK6DW, Ray VK6ZRW, Marty VK6RC and Martin VK6ZMS. Valuable support was provided by Alan VK6PWD, Christie VK6XCJ and Rob VK6AAH. John VK6FJON and Rob VK6LD also visited for short periods. Christie VK6XCJ was our photographer for the weekend and produced some

amazing night shots of the Yagi with star trails as a backdrop.

We drew a lot of interest from the other campers, explaining what we were doing and demonstrating the gear. They were suitably impressed when someone said, "They are in Queensland", referring to the contact that was just made. A few smiles were seen when Ray VK6ZRW, described the group as similar to the Hash House Harriers. He explained that it had been said that they were a drinking club with a running problem and described us as a camping group with a radio problem, HI.

HF contacts were hard work. HF propagation was suppressed and thunderstorms were all around. Static crashes at 10 to 20 dB over 9 didn't help. At least we didn't have lightning hitting the ground nearby as other locals had reported. The path back to the metro area and to other portable stations proved shocking, with not a single VHF or UHF contact made. We live and learn. The HF and the company made up for it. When contacts dried up late in the evening, attention

Photo 3: Peel Hamfest.





was turned to some overseas DX. Some great reports from the loop on 40m were received from stateside. Overall we made fewer contacts than last year but all who attended had a great time. Thoughts have already turned to a better location for next year.

My thanks to Ian VK6DW and Ray VK6ZRW who, between them, penned all of the above information. HARG would like to thank all of the members who organised our John Moyle Field Day and we look forward to getting out there again next year. As I write this we are two weeks away from HARGfest and I will report on that in the June issue.

HARG Meetings are held twice a month at the club rooms at the Paxhill Guide Hall near the corner of Brady and Sanderson Roads in Lesmurdie. The Social and Practical meeting is held on the second Saturday of the month and the General Meeting, often with a technical talk, on the last Saturday of the month. Doors open at 1.00 pm for a barbecue lunch and the meeting starts at 2.00 pm. Everyone is welcome. More information at [www.harg.org.au](http://www.harg.org.au)

Cheers from Bill VK6WJ, Publicity Manager for the Hills Amateur Radio Group.

Thanks again Bill.

## Bunbury Radio Club

Next up we have what Norm describes as a "modest contribution" from the Bunbury Radio Club.

Johnathan VK6JON, Alek VK6AP and Dicko VK6VRO participated in the John Moyle contest. I don't have the details, but understand that they put in a creditable performance. Several members also attended the Peel Club's Hamfest and reported that it was a great day. Well organised and well attended.

We are discussing a proposal to set up a club radio station for training purposes. This would permit and promote a great deal of interaction with more experienced members in order to demonstrate

the operation of ham radio to those of limited experience. It would also facilitate experimentation from a club perspective in areas such as antenna construction. The project is in an early stage yet as much is to be considered.

It was agreed that some members have significant knowledge and skill with the newer aspects of amateur radio, while others have only limited awareness. There is a valuable and often untapped knowledge base within the club that would be of great benefit to many. The club is reviewing processes whereby these skills and knowledge could be transferred. Mechanisms such as technical forums and talks aimed at the lower level are being considered.

Andrew Smith VK6AS gave a presentation on his candidacy to be elected to the board of the WIA. Andrew has a very strong administrative and legal background and the Club supported his view that this ability was just as important as detailed technical knowledge. All members were supportive of his aims and aspirations if elected.

Anyone interested in sitting for Foundation or other licence upgrades should contact Norman VK6GOM on 0438 878 582.

The next monthly meeting of the Bunbury Radio Club will be held on Saturday, February 13 from 2:00 pm. at 21 Halsey Street, Bunbury. Locations for future meetings are:

- April – Bunbury
- May – Harvey
- June – Bunbury

Any South West based amateur (or anyone interested in radio or electronics) is more than welcome to join and participate in our activities. Because so many of our members come from near and far, we are evolving into a semi "virtual" club. Consequently, regular attendance at meetings is not a requisite for membership. The annual fee is only \$25.00. Those wishing to join can contact the Club

via our Secretary, Nick Evans on 0429 201 343, or [vk6brc@wia.org.au](mailto:vk6brc@wia.org.au)

Cheers Norm, best of luck with the club station.

## John Moyle Memorial Field Day

Now we have a report on John Moyle Field day from Adrian VK6NK.

Like so many of the amateur radio groups in VK6, **Sawyers Valley Volunteer Bush Fire Brigade** mounted a team for the John Moyle Memorial Field Day. With a much expanded group from last year, and sporting a brand new club call-sign (VK6SVB), the brigade was hopeful for a long and successful day. Unfortunately, like so many stations around Perth, we hadn't counted on the rain.

The weather station recorded a mere 16mm for the day, but this was likely because the tipping-bucket rain counter couldn't keep up! The only consolation was that we were in our nice, warm fire station and not out in the middle of it like some other groups.

In the end, despite the rain and lightning, VK6SVB managed four concurrent operators for the full six hours and more than doubled the number of contacts from the previous year. We demonstrated our ability to operate as an emergency communications facility, under trying conditions and again learned a lot in doing so.

Many thanks to Adrian VK6NK, Alan VK6AF, Andrew VK6WAM, Keith VK6WK, Peter VK6IS and Peter VK6PM. Special thanks also to Warren and Ashley for their help in running cables and Bob VK6UK for supplying over 300 AH worth of batteries.

Sawyers Valley Brigade is still really keen to see other emergency services groups get involved in this great event. Contact your local bush fire brigade, SES unit or sea rescue group and get a station set up for next year!

It was indeed a very wet JMFD for most groups north and east of the City.



Next up we have a report from Bob VK6POP on behalf of WAARN

## WA Amateur Radio News

WAARN has expanded its stable of media for the promotion of Amateur Radio in Western Australia. We record and broadcast the NewsWest Amateur Radio News Programmes, maintain the VK6.NET Amateur Radio Gateway website, operate the VK6 Amateur Radio Facebook Group, and have our own YouTube channel where we display our home brew club promos. Not seen it? Search YouTube for "NewsWest"

At the time of writing, we mourn the recent passing of Wally Gelok, VK6YS (SK) who was a valuable contributor to the NewsWest bulletins. Wally will be sorely missed.

We had a go at the John Moyle Memorial Field Day, using the historical VK6WI callsign. We found a site with elevation, no RF noise and a good camping spot on the top of a hill in Wandoo National Park.

Along with several other portable operators, the weekend was marked

by a lot of rain. Fortunately our site was well drained and our canvas kept us dry. I can't say much for the lightning protection though. Peter VK6RV sustained a nice little burn to the hand from a nearby lightning strike. Propagation conditions were not good, however in spite of making about half our usual number of contacts; we had an enjoyable weekend punctuated with good food.

By the time this issue of the Magazine goes into the post, PerthTech and the raffle will have happened, and there will be a full report on that.

Thanks Bob, I certainly hope PerthTech is a huge success.

March saw the inaugural **PARG** Junk sale, a report from VK6DQ.

## Peel Amateur Radio Group VK6ARG

Sometime towards the end of 2015 one of our members suggested we have a junk sale. Yeah right! There was much rattling of brains to find something to sell and there was not really a tremendous amount that we came up with. Then it was

Christmas and the New Year, both busy times and probably too hot. That same Amateur would just not go away and early in 2016 the "Let's do a Junk Sale" call was raised again. This time he had a venue and a tentative date. We could do that and we did.

We considered various venues and dates for months before and were constrained by the availability of the final choice - which turned out to be ideal due to its location, ease of access by road and rail and its facilities. Definitely a consideration for future events.

On 5 March 2016, the Peel Amateur Radio group held their first ever Junk Sale at the Bortolo Pavilion in Greenfields. Junk Sale conjures up memories of sales that I attended back in the late 70s just before I came on air. Now they were something to remember. Of course in those days we were probably at the end of the greatest homebrew era in ham radio ever. Tables full of magic amateur bits to build the biggest most wonderful wireless equipment one could imagine. There was so much surplus gear

Photo 2: WAARN JMFD.





for sale. Well I am pleased to say that the Peel Amateur Radio Group pulled it off. It was a magnificent sale reminiscent of earlier days.

We did it with the combined efforts of the members and XYLs. Stevie VK6SMK was the instigator of it all. Not only that he was responsible for the catering and many can testify to the quality of his hamburgers which I am sure contained a good dose of Haggis from his homeland. Amateurs came from far and wide, they brought with them mountains of things for sale. Plenty of goodies that were pulled out of secret hiding places, new stuff, old stuff, interesting stuff, and tables full of stuff. We filled a lot of tables and a lot of gear changed hands. More importantly many amateurs renewed friendships and met new people. There is no better place to rag chew than a good junk sale.

The members of the Peel Amateur Radio Group would like

to say a big thank you to all who attended, some from many miles away, without you it would not have a success. Rest assured, this is the first of more to come.

Unfortunately I was unable to attend myself, visitors arrived from G land the same day, but I will be there next year! Thanks PARG.

## NCRG

NCRG had a busy outing in the John Moyle as well, with torrential rain, small hail and torrents of water running through the operating position! I believe bailing the tent was the busiest operation for the weekend. Anyway everyone had fun, so they tell me; I was down in the sun at Busselton.

Work has started on this year's **Hamfest**, with the date set as 7 August, the first Sunday in the month. The usual location at Cyril Jackson Rec Centre Fisher St Ashfield 6054. We are hoping to make this year's Hamfest somewhat

different with several new vendors approached and a significant increase in commercial suppliers attending. A much larger Hamfest committee is exploring many different ideas and hopefully there will be a lot of new things to see and do.

The homebrew competition will be hotly contested I'm sure, as the standards are increasing every year. Once again our raffle will be a major drawcard with some exceptional prizes on offer and there will be no increases in prices for the door entry, raffle etc.

Be sure to put the date in your diary 7/8/2016, 9 am for buyers.

I am the contact for Hamfest so drop me an email if you are looking for a table etc.

That's it for this month; please keep up the contributions if you want others to know what your group has been up to.

73 de Keith VK6RK



## AMSAT-VK

AMSAT Co-ordinator  
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Group Moderator  
Judy Williams VK2TJU  
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Website:  
[www.amsat-vk.org](http://www.amsat-vk.org)

Group site:  
[group.amsat-vk.org](http://group.amsat-vk.org)

### About AMSAT-VK

AMSAT-VK is a group of Australian amateur radio operators who share a common interest in building, launching and communicating with each other through non-commercial amateur radio satellites. Many of our members also have an interest in other space based communications, including listening to and communicating with the International Space Station, Earth-Moon-Earth (EME), monitoring weather (WX) satellites and other spacecraft. AMSAT-VK is the primary point of contact for those interested in becoming involved in amateur radio satellite operations. If you are interested in learning more about satellite operations or just wish to become a member of AMSAT-Australia, please see our website.

### AMSAT-VK monthly net Australian National Satellite net

The net takes place on the 2nd Tuesday of each month at 8.30 pm eastern time, that is 0930 Z or 1030 Z depending on daylight saving. Check-in starts 10 minutes prior to the start time. The AMSAT-VK net has been running for many years with the aim of allowing amateur radio operators who are operating or have an interest in working in the satellite mode, to make contact with others in order to share their experiences and to catch up on pertinent news. The format also facilitates other aspects like making 'skeds' and for a general 'off-bird' chat. In addition to the EchoLink conference, the net will also be available via RF on the following repeaters and links.

#### In New South Wales

VK2RBM Blue Mountains repeater on 147.050 MHz

#### In Queensland

VK4RIL Laidley repeater on 147.700 MHz  
VK4RRC Redcliffe 146.925 MHz IRLP node 6404, EchoLink node 44666

#### In South Australia

VK5TRM, Loxton on 147.175 MHz  
VK5RSC, Mt Terrible on 439.825 MHz IRLP node 6278, EchoLink node 399996

#### In Tasmania

VK7RTV Gawler 6 metre repeater 53.775 MHz IRLP node 6124  
VK7RTV Gawler 2 metre repeater 146.775 MHz IRLP node 6616

#### In the Northern Territory

VK8MA Katherine 146.700 MHz FM

Operators may join the net via the above repeaters or by connecting to EchoLink on either the AMSAT or VK3JED conferences. Past experience has shown that the VK3JED server offers clearer audio. The net is also available via IRLP reflector number 9558. We are keen to have the net carried by other EchoLink or IRLP enabled repeaters and links in order to improve coverage. If you are interested in carrying our net on your system, please contact Paul via email. Frequencies and nodes can change without much notice. Details are put on the AMSAT-VK group site.

## Become involved

Amateur satellite operating is one of the most interesting and rewarding modes in our hobby. The birds are relatively easy to access and require very little hardware investment to get started. You can gain access to the FM 'repeaters in the sky' with just a dual band handheld operating on 2 m and 70 cm. These easy-to-use and popular FM satellites will give hams national communications and handheld access into New Zealand at various times through the day and night. Currently only SO-50 is available.

Should you wish to join AMSAT-VK, details are available on the web site or sign-up at our group site as above. Membership is free and you will be made very welcome.



# The Gift of Single Side Band

Bob Gilchrist G3WUD, VK1BOB, A92FZ, VK2HH

1967 held a great significance for me, even greater than the race riots in the United States or the release of Purple Haze by Jimi Hendrix. Three months after passing my Morse test and theory exams, I was rewarded with the arrival of a letter from the Postmaster General of the UK. I had been issued a full amateur radio licence, just two weeks after my fourteenth birthday. The ten watt top band transceiver that had been laboriously home-brewed over the preceding twelve months could finally be released from its light bulb dummy load! G3WUD was on air!

Top band (160 metres) was a great place to test the new hobby and I soon had a group of mates within a 40 mile (approximately 65 km) radius to rag-chew with on a daily basis. My Eddystone 640S proved to be a stalwart and I was rarely to be seen outside my bedroom shack. G3LYW dominated top band signals with his OCF full wave at 65 feet. But even with my modest antenna I was able to rack up a goodly number of contacts. County counting was the measuring stick by which a top band operator was judged. England was divided into 48 ceremonial counties, which were also known as geographic counties. Outside Greater London and the Isles of Scilly, England was also divided into 83 metropolitan and non-metropolitan counties. The RSGB published a monthly competition table in RadCom showing how many counties had been QSL'd by each operator. I recall reaching around 50 counties, but my 10 watt AM rig and quarter wave end fed antenna set limits on what could be achieved. SSB made all the difference to reaching up to the north of Scotland or the tip of Cornwall. But an SSB rig was way beyond my means, on a pocket money of only five shillings a week!



Photo 1: The Eddystone S640 receiver.

Around November 1967, I sent the Editor of RadCom my county totals and mentioned in passing my disappointment at the high cost of even the cheapest SSB rig. To my astonishment, he quoted from my letter in RadCom, asking if anyone could help me. About a month later, heading into Christmas, I received an unexpected gift through the mail.

KW Electronics was founded in the mid-fifties by the late and legendary Rowley Shears G8KW. Based in Dartford, Kent, the firm built and sold many items used by amateur operators. Their flagship

product was the KW2000 transceiver, which was an SSB rig with 100 watt PEP output. All the big name operators with deep pockets used the KW2000 rig, which was famous for its ability to cut through

the ether with outstanding speech quality.

Rowley had read about my plight in RadCom and decided to help. He posted me a bandpass filter that would allow me to build an SSB transmitter. He even sent me circuit diagrams to get me started. The filter alone would have cost twenty pounds or the equivalent of a year's pocket money. I was overwhelmed and delighted!

It took me a year to build that SSB rig and it truly was a labour of love. I built it for 80 metre operation, having heard that DX was much



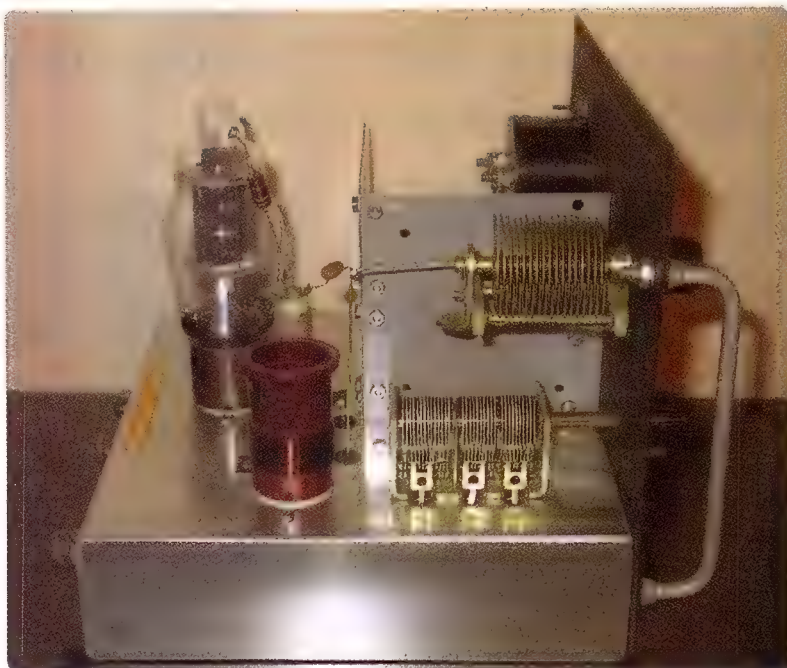
Photo 2: The K.W. Electronics Ltd. KW2000A 6-band transceiver.



more prolific on that band. How true that proved and before I knew it, I had made contact with stations in Australia and even South America on 80 metres. All my school geography lessons were starting to seem more useful than I could ever have expected.

It's hard to say how many thousands of contacts I have made since I built that first SSB rig. The rigs have changed, the call signs have changed but the passion lives on. But there is little doubt that without Rowley's unsolicited gift, my interest in the hobby of amateur radio would long ago have waned. Thanks Rowley!

*Photo 3: The author's home brew top band SSB transmitter with 807B.*



## Silent Key

Owen James Nattrass ex VK4ON

Owen was a keen CW operator, a Radio Inspector and flew with Bomber Command in WWII.

Owen James Nattrass passed away on 12 November 2015 aged 91 years.

Owen's first job was as a messenger boy delivering telegrams around Brisbane city on foot and by push bike. His first big break came in 1940 when he passed the entrance exam for the Railway Department. Lad-porters were expected to learn Morse code and this Owen did at night classes.

With the WWII conflict dominating the lives of everyone, Owen enrolled as an RAAF Air Training Cadet and received more Morse code operator training. In 1942 he was of an age to be called-up for military service, however, Australian railway operations were essential to the war effort and Owen's role was designated as a "Reserved Occupation". The Railway Department refused to release him. Regardless, the RAAF made several requests and Owen was eventually released. He commenced military training in 1942 at the young age of 18 years. More specialised Training as a Wireless Operator / Air Gunner (WAG) was undertaken in Canada and in England.

Owen, along with many other Australians, was attached to the famous 10 Squadron of RAF Bomber Command and flew in Handley Page Halifax MK2 heavy bombers. After

the war, Owen was awarded the Diploma of Honour by the French Government in recognition and appreciation of his involvement to free France during the Normandy Campaign.

Meanwhile back at home, and even though Owen was on operational duties, the Railway Department never gave up trying to get him back on the Railway. Persistence by them finally paid off in September 1945 - but only after the war in the Pacific ended.

Morse code was not the sole skill developed by Wireless Operators. They also studied radio and electrical theory to help them to keep the aircraft equipment operational. Owen wanted to use his technical knowledge and commenced with the PMG in 1946 maintaining manual telephone exchange equipment.

Owen gained his Amateur Operators Certificate of Proficiency (AOCP) in 1958 and continued his studies for the First Class Commercial Operators Certificate of Proficiency (1st COCP) which he received in 1959. He gained experience by working at broadcast-radio transmitting stations around Brisbane. The standard of the 1st-Class certificate was highly regarded by the Radio Branch of the PMG and Owen was offered a position as an Assistant Radio Inspector in 1959. His duties included inspections of amateur radio

stations and investigation of interference to radio reception - an activity in which his persistence and adherence to process and protocol produced results. Owen never gave up on self-improvement and after more hard study passed the Radio Inspector's examination in 1963. His position, when he retired in July 1986 from the Department of Communications (DOC), was as the Assistant Manager, Qld., with responsibility for regulatory and compliance matters across the State.

Owen's amateur radio activities were mostly confined to CW operation on 40 and 20 metres where he enjoyed regular QSOs with his CW friends. He liked to build things and was proud of his home-brew GDO. One of his transmitters was a valve unit which was home-brewed by another local identity. It was VFO controlled and used two 6v6 and an 807. Owen mentioned that he also operated it on AM. A series modulator was plugged in place of the Morse key in the cathode of the 807 PA tube. That Tx was recently refurbished and has been used regularly on the Boat Anchor AM Net on 40 m.

Owen's last radio was a Kenwood TS-520. The CW filter helped his enjoyment with CW contacts and he used it until ill health caused him to close his station.

73

Gary Ryan VK4AR





## Contributions to Amateur Radio

AR is a forum for WIA members' amateur radio experiments, experiences, opinions and news.

Your contribution and feedback is welcomed.

Guidelines for contributors can be found in the AR section of the WIA website, at <http://www.wia.org.au/members/armag/contributing/>

Email the Editor:  
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on 03 9782 6612 .

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# WIA Functional Committees

The WIA is a membership organisation with a very wide range of complex functions and member services. Core functions and services are administrative in nature (general administrative functions, membership services, examination and call sign management, financial etc...) and are performed by salaried staff.

Volunteers perform a diverse range of highly specialist functions (ACMA liaison, Frequency Co-ordination, Standards liaison, Interference issues, technical support and training and assessment etc.). These volunteers provide the majority of member services, however they have been loosely organised and often overstretched.

The new committee system attempts to structure the WIA's non-core activities into 10 broad functional areas, each comprising a team of volunteers under the direction of the WIA Board. This structure is intended to spread the workload on our volunteers, improve communications between members and the WIA Board, improve services to members, and encourage more people to become involved in the WIA.

## WIA Committee Charters

### Spectrum Committee

(Regulatory, ACMA, ITU, IARU, Repeaters & Beacons, Standards, Interference & EME, Monitoring Service)

Andrew VK4QF, Brian VK3MI, Dale VK1DSH, Gilbert VK1GH, Jim VK3PC, Noel VK3NH, Peter VK3APO, Peter VK3MV, Phil VK2ASD, Richard VK2AAH, Rob VK1KRM, Roger VK2ZRH, Ron VK3AFW.

- Perform all ITU and IARU liaison activities.
- Liaise with, and act as the 1st point of contact for, the ACMA.
- Advise the Board, and enact Board policy in relation to all radio communications regulatory issues and the LCD.
- Represent the WIA to State and Local Government
- Represent the WIA to Standards Australia
- Provide specialist technical advice and coordinate repeater and beacon licence applications and frequency allocation.
- Develop responses to significant and prolonged harmful interference issues affecting amateur radio operations.
- Provide an information resource for EMC/EMR issues.
- Administer the IARU Monitoring Service in Australia
- Provide a technical resource to other committees and the WIA Office.

### Technical Advisory sub-Committee (Tech support, Band plans etc.)

Amanda VK1WX, Barry VK2AAB, Bill VK4XZ, Doug VK3UM, Eddie VK6ZSE, John VK3KM (Co-ordinator), Paul VK2TXT, Pau VK5BX, Peter VK3APO, Peter VK3BFG, Peter VK3JFK, Peter VK3PF, Rex VK7MO, Tim VK2ZTM, Walter VK6KZ

### General Committee

Executive Administrator TBA, President (Phil, VK2ASD), Vice President (Fred, VK3DAC), Treasurer (Chris, VK3QB), WIA Secretary (David, VK3RU)

- Responsible for the efficient and correct operation of the WIA office.

- Responsible for staffing and workplace safety.
- Provide a specialist administrative resource to the WIA office as required.
- Manage contractual agreements.
- Manage business relationships.
- Ensure compliance with the ACMA Business Rules
- Prepare yearly budgets
- Prepare quarterly financial reports for the Board
- Prepare independently reviewed YE financial reports and balance sheets for circulation to the membership prior to each Annual General Meeting.
- Manage insurances and to be responsible for currency of insurance policies.
- Maintain a complaints register.
- Ensure complaints are handled in accordance with WIA policy and any contractual agreements.

### Communications, Media and Events Committee

Jim VK3PC, Phil VK2ASD, Robert VK3DN, Roger VK2ZRH

- Communication with members and the public:
- Communicate with the membership.
- Publicise WIA activities and initiatives.
- Develop strategies and resources for the promotion of Amateur radio to the public.
- Develop strategies and resources for the promotion of WIA membership to the Amateur community.
- Supervise and/or perform promotional activities.
- Co-ordinate the yearly AGM activities

### Education Committee

Fred VK3DAC, Ron VK2DQ, WIA Executive Administrator TBA

- In association with the WIA's RTO and affiliated clubs offering training services, develop and administer the WIA's training and assessment systems.
- In association with the Spectrum Strategy Committee, develop and maintain the various licence syllabi and associated question banks.
- In association with the Community Support Committee and the RTO, develop and maintain the Emergency Communications Operator scheme.
- Ensure the confidentiality and security of all personal information, question banks and examination papers.

### Grants Committee

Drew VK3XU, Gary VK2KYP, Peter VK3PF (Coordinator), Peter VK3PH, Scott VK3CZ

### Radio Activities Committee

WIA Director TBA

### Contests sub-Committee

Alan VK4SN, Colin VK5DK, Denis VK4AE / VK3ZUX, James Fleming VK4TJF, John VK3KM, Kevin VK4UH, Tony VK3TZ

### Operating Awards sub-Committee

Bob VK3SX (Coordinator), Alan VK2CA, Alek VK6APK, David VK3EW, Laurie VK7ZE, Marc VK3OHM, Paul VK5PAS

### ARDF

Jack VK3WWW (Co-ordinator)

### ARISS

Tony VK5ZAI (Co-ordinator)

- All activities associated with actual radio operation, such as: contests, awards, distance records, QSL services, ARISS, AMSAT, ARDF etc.

### QSL Card sub-Committee

Alek VK6APK, Alex VK2ZM (Outwards Manager), John VK1CJ, John VK7RT, June VK4SJ, Max VK3WT, Stephan VK5RZ, WIA Office (Inwards Manager)

### Historical and Archive Committee

David VK3ADW, Drew VK3XU, Ian VK3IFM, Jenny VK3WQ, Linda VK7QP, Martin VK7GN, Peter VK3RV (Coordinator), Will VK6UU

- Develop, maintain and preserve the WIA's historical and archive collection
- Encourage access to the collection by WIA members and those seeking historical material for publication.

### IT Services

Robert VK3DN, Marc Hillman VK3OHM, Tim VK3KTB

- Provide an IT resource to other committees and the WIA Board.
- Be responsible for the off-site data back-up of all IT systems information.
- To update and maintain the WIA website as required.
- Advise the Administrative / Financial committee in relation to the MEMNET Cloud Service contract.

### Community Service Committee

Fred VK3DAC (Director), Greg VK2SM (Assistant Treasurer), Ewan VK4ERM (Director), Paul VK5PH

- Develop, promote and co-ordinate all WIA community support activities

### New Initiatives

Phil VK2ASD (Director), Robert VK3DN (Director), Roger VK2ZRH (Director), David VK3RU (Company Secretary)

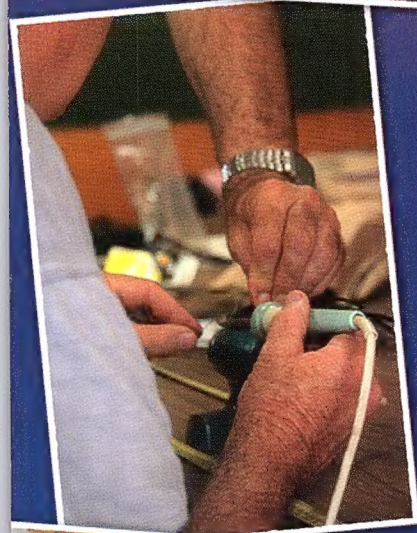
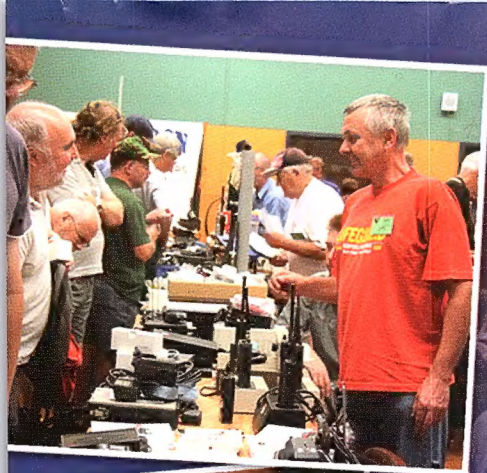
- Think-tank ideas and initiatives to advance amateur radio and WIA membership.
- On approval by the Board, run proof of concept trials.

### Affiliated Clubs Committee

Ted Thrift VK2ARA, President (Phil Wait VK2ASD), Vice President (Fred VK3DAC)

- Manage all arrangements between the WIA and WIA Affiliated Clubs
- In cooperation with the Administrative / Financial committee, manage the Club Insurance Scheme
- Encourage stronger relationships and communications flow between the WIA and WIA Affiliated Clubs
- Encourage increasing WIA membership ratios in Affiliated Clubs
- Manage the Club Grants Scheme
- Identify and bring regional Affiliated Club issues to the attention of the WIA Board.





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